UNITED STATES BANKRUPTCY COURT
FOR THE WESTERN DISTRICT OF NORTH CAROLINA
CHARLOTTE DIVISION

IN RE:	)	
	)	
GARLOCK SEALING TECHNOLOGIES LLC, et al,	)	No. 10-BK-31607
	)	
Debtors.	)	VOLUME II-A
	)	MORNING SESSION

TRANSCRIPT OF ESTIMATION TRIAL
BEFORE THE HONORABLE GEORGE R. HODGES
UNITED STATES BANKRUPTCY JUDGE
JULY 23, 2013

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E X H I B I T S

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P R O C E E D I N G S

JULY 23, 2013, COURT CALLED TO ORDER 8:30 A.M.:

MORNING SESSION:

THE COURT: Morning have a seat. We have the motion about confidentiality this morning.

It occurred to me reading your papers and such that the difficult problems come with this issue if there's a public interest, and I notice yesterday there didn't seem to be a whole lot of public interest, and I'm wondering if we couldn't proceed kind of in the way -- with the trial, in the way we did with the opening yesterday. Would that satisfy you all's ends and just close the courtroom to anybody that's not issued -- not signed the confidentiality agreement?

MR. CASSADA: Your Honor, obviously this is our motion to de-designate. We have an interest in having a trial being open to the public. We realize that the rights that we have asserted before the court are really the public's rights to access.

We believe that before the court orders that a hearing be closed, or that special provisions be made to protect information, that the burden is on the party seeking protection to prove that it's the kind of information that courts recognize, and that the information would render the kind of injury that courts typically would rule would be the -- would be protectable.

And we don't -- so we really think that the burden is on the law firms and the committee to explain exactly what it is that's confidential and why it's confidential.

I will point out that the beginning of the *Bondex* case, that's exactly what Judge Fitzgerald said. She complained that the parties were just taking this blanket position that things were confidential and they were filing things under seal, and she said that's not the way we do it. You have to tell me specifically what is confidential and why it's confidential, and then let me make a decision at the time whether we should see it.

So obviously that's why we filed the motion. That's the way we would like to proceed.

However, we'll certainly defer to the court -- the court's view of the best way to proceed on this. We would want to be sure that whatever the court does, it doesn't interfere with our ability to efficiently conduct the trial and put our case on.

THE COURT: Mr. Wehner.

MR. WEHNER: Your Honor, to answer your question, I think we would be happy to proceed along the lines that we did yesterday.

What we did, we circulated a proposed order on a couple of occasions over the weekend to the debtors that -- two page order, it's very short, that takes that kind of

approach to dealing with confidentiality at the hearing, that is, closing the courtroom for those limited times when somebody has to talk about confidential information, and keeping things that are submitted to you in paper form, to keeping them sealed or covered by the confidentiality order in your hands.

Like I said, we've got a short order that we've given the debtors a couple times now. We think that way of dealing with it, that way we can work with the issues that have come up.

We've got seven confidentiality orders in this case, covering a wide variety of material, with a lot of people who have interests in that material, a lot of people who aren't here, a lot of people who aren't noticed by there motion, so we have to tread carefully. But we think the approach that we sketched out in this short order which is very much in line with what we did yesterday will work.

Do you want to hear the motion?

MR. CASSADA: May I ask a question?

THE COURT: Yes.

MR. CASSADA: That is -- well, first of all just to respond to the notice issue.

We have -- in our motion we have focused on the specific issue of the deposition testimony and documents of the law firms, and we've given the law firms notice. I don't

believe there is any notice issue, but just to get clarification on the court's order. When the court clears the courtroom, is there going to be an order that actually holds the testimony or the evidence presented during that time period is in fact under seal, and it should not be shared with members of the public?

THE COURT: I think that's probably how we ought to proceed with the specific order, and do the best we can to see that we comply with that.

It's a very -- I mean, it's a -- seems to me to be fairly important to you all, but it's a pretty narrow, limited part of the whole bundle of the hearing that we have here. Seems to me we would handle it in that way to be a minimal kind of intrusion on -- to the public affair of the trial.

It's not -- I think it seemed from the opening yesterday, none of it seemed particularly sexy or something that anybody would be of any particular interest in, other than the parties.

MR. CASSADA: Yes.

THE COURT: So I don't think we're really denying the public any great -- any earth shattering kind of information by doing this.

MR. CASSADA: There is -- we believe there is substantial public interest in the type of information you heard yesterday, and the -- even the law firms we think

recognize that, and even the committee seems to. Because we have -- we've seen at least one of the law firms has given public testimony about the testimony and the discovery made in our case, mentioned our position, mentioned their client by name, and testified about the position we had taken, and why the evidence didn't support it, and that testimony is actually a matter of public record and it's before the ABA task force that's been -- that's focusing on whether to approve a bankruptcy rule that would require trust transparency.

THE COURT: We're here for trial, so that's how this -- that's how -- the only reason this information is gathered, and that's where I intend to limit it at this point.

MR. CASSADA: Certainly, yes.

THE COURT: I mean, I -- I mean, there's lots of considerations here, but the claims of confidentiality were broad, but also the moving party here is somebody who agreed to the confidentiality. So, you know, there's things on both sides to this --

MR. CASSADA: Well, Your Honor, let me address that for a minute, because that goes to an argument that we've somehow agreed to something and have occasioned a bait and switch, and we take exception to that.

The stipulated protective order wasn't an agreement that any particular information was confidential. In fact, it was entered into before the documents in discovery were given

in this case.

The point of the order was to agree to a procedure wherein parties would be permitted to designate in good faith, documents and information that's confidential, and save for another day any dispute about those. That's exactly what happened in this case. We entered into the stipulated protective order. We amended it before this depositions to allow third parties to make designations under the stipulated protective order. But the order is very clear. They're making these stipulations -- in this case they were designating information in advance and the stipulated protective order actually has provisions to permit a party to contest or challenge specific information that's provided.

So there's no basis for really concluding that entering into a stipulated protective order was an agreement that any information provided after that would be worthy of protection and shouldn't be offered in open court.

The language of the order is really quite clear on that, and even in paragraph 10, which preempts by its terms, the remainder of the agreement, it says that notwithstanding any other provision in this stipulated protective order, any receiving party may disclose confidential information in the manner and to extent authorized by an order entered by the court, upon a motion submitted to the court not less than five business days notice to the producing party, and after a

hearing on the motion, unless the court orders that no hearing be held.

So that's really what the stipulated protective order was all about.

And we have -- we have obviously moved to be permitted to air this information in open court, exactly as the stipulated protective order provides. So if there's any reliance, it's our reliance on the procedures of the stipulated protective order.

I'm going to sit down, but we just think that before the court enters an order recognizing information as confidential, and denying public access, that a party whose providing the information has the burden of showing the court that that type of protection is warranted in the case, and that's a heavy burden. That simply hasn't been met or even offered in this case.

Obviously we will abide by any order the court procedure you suggested, seems like it would allow us to move forward in trial inefficient manner. That's our number one interest today and over the next three weeks.

MR. WEHNER: Your Honor, in a spirit of trying to come up with a way of moving forward, can I share with you the effort that we've shared with the other side?

THE COURT: All right.

MR. WEHNER: I said it was two pages, I guess I was

a little over ambitious, it's three pages. But basically the first couple paragraphs say that written material that comes into you keeps its designation. We're going to try and keep track of what's confidential and what's not confidential, and before the conclusion -- within 30 days of conclusion of estimation hearing, we'll submit to you an agreed list of what was used that was confidential so that you know.

And then just like we did yesterday, if in the course of an argument or testimony by a witness somebody needs to get into something that's covered by one of the confidentiality agreements, we request you to clear the courtroom of persons not entitled to access. That's about it.

THE COURT: Do you have any specific problems with implementing this order, Mr. Cassada?

MR. CASSADA: Your Honor, what we would ask is that the order have a provision in it that specifically states that after the evidence is entered and you have a chance to see what it is, that we can visit without prejudice the issue regarding whether this information really is information that should not be open to the public.

THE COURT: I think we can do that pursuant to paragraph six, can we not?

MR. WEHNER: Yes.

MR. CASSADA: If that's the understanding.

THE COURT: I believe it is. We can revisit any

order entered. Why don't we enter this order, if you'll upload it and I'll enter it.

MR. WEHNER: We'll do so today, Your Honor.

THE COURT: We'll proceed under that fashion, as long as it's just here, just us that are interested in it and see if that won't work.

I will have to ask if you all have to work out a procedure to release it when you do -- when you do get to the portion that we need to seal the courtroom, let me know. But then you need -- we may need to post somebody at the back door to keep other people from coming in during the process. Okay?

MR. WEHNER: Yes, sir.

THE COURT: All right. That's what we'll do.

And then I need to -- we had one bit of slippage yesterday while we were doing this, and we have the transcripts that were sent out, went to one party who was not -- who had not signed a confidentiality agreement. And we've asked them to send that back. We've got the email trail for you all that was -- something Capital. Let me give you all these, start reading. It's a typical email chain, you've got to read backwards. Somebody got it and notified us and now we have asked them to return the transcript that was sent.

Let me give you all a chance to read that, and I guess we'll come back at 9:30. If you've got any other ideas about what we can do about that, let me know. We just asked

them to send the transcript back.

If you want to read it right now, we can talk about it now.

(Pause.)

THE COURT: I don't know that part I guess maybe you all do, sounded like a stock broking outfit to me and they were concerned that --

MR. WEHNER: Don't seem particularly interested, Your Honor.

THE COURT: Yeah. I think they were mainly interested that they didn't get busted for insider trading.

Do you know them, Mr. Cassada?

MR. CASSADA: This is -- a company that trades in securities markets, and we do have a concern about them having selected information if this is deemed confidential.

THE COURT: Do you have any other solution other than asking them to send stuff back?

MR. CASSADA: You might -- it sounds like from reading this that they're saying that they had stopped reviewing --

THE COURT: Right.

MR. CASSADA: -- transcript. Might be the court might consider entering an order instructing them to return the transcript, destroying the copies, et cetera. I don't know if the court has the power to enter that order, but

giving them notice they certainly, from this email seem to be open to that.

THE COURT: Yeah, I think --

MR. CASSADA: But it's certainly a problem having --

THE COURT: I think it sounded like they felt like they had a hot potato and they didn't want to --

MR. DAVID: Yeah, Your Honor. Mark David from Coltec and Rick Magee here who is also general counsel for the company in securities, probably knows more about securities law than anybody else in this courtroom. If he could come approach --

THE COURT: Sure.

MR. DAVID: -- and at least address the issue, make sure we cover it from a public filing standpoint.

MR. MAGEE: Thank you, Your Honor. We just want to make sure that we don't have a selective disclosure issue, since one shareholder now has information the other shareholders don't. So any kind of order you could enter requiring them to keep it confidential and return the information, we'll also try to get an agreement from them to do that.

THE COURT: Could you all draft an order, because I don't know anything about securities law.

MR. MAGEE: Yes, sir, we would be glad to do that.

THE COURT: Would do all the things you need to do

to protect. Because it doesn't sound like, you know, they wanted it anymore than you wanted them to have it. Okay?

MR. WEHNER: That's fine with us, Your Honor.

THE COURT: All right. Good. Thank you.

MR. DAVID: Thanks, judge.

THE COURT: All right. Let's come back at 9:30.

(A brief recess was taken in the proceedings at 8:50 a.m.)

(Court reconvened at 9:31 a.m.)

DAVID GARABRANT,

Being previously duly sworn, was examined and testified as follows:

CONTINUED DIRECT EXAMINATION

BY MR. SCHACHTER:

Q. Good morning. Dr. Garabrant, when we concluded, we had gone through your initial summary slide, and we concluded with the literature that is most recent on gaskets and brake exposures.

I talked to you about the fact that you would be able to help to understand how the scientific method works for these issues and epidemiology. Have you prepared some slides that will help us understand that?

A. Yes.

Q. If you would, could you please explain how the scientific method works to resolve issues of causation?

A. Yeah, the scientific method has been developed over, at least a couple of hundred years throughout all branches of science, and I think all scientists follow it, regardless of their discipline, with minor variations.

In medicine we typically start with case reports which are an initial observation that is typically written up and published of an interesting case. So I saw a patient who had this unusual presentation, and we found that he had a genetic abnormality in this chromosome, and I think that abnormality caused the disease.

That statement is a hypothesis. And a hypothesis is a speculative statement it is not scientific evidence. It's a statement of, I think this might be an important idea.

In order to prove up a hypothesis, you have to do a scientific study. Scientific studies collect data according to defined protocol. In medicine and biology, you have to have a control or a comparison group. After you've collected your data, you analyze it. Every branch of science relies on statistical methods now for data analysis, datasets get complex.

And when you're done analyzing your data, you have to answer a pretty straightforward question: Does the data support the hypothesis or not?

If you find evidence of an association between that agent or that genetic abnormality and risk of disease, you say, hey,

there's an association, I think I was right. The hypothesis appears to be true.

If you don't find an association, you say, nope, hypothesis is not supported by the data, it appears to be wrong, and you start over. That's what scientists spend their careers doing, going round and round doing -- raising hypotheses, designing studies, collecting data, analyzing it, and looking to see if their hypotheses are right.

Q. Now, what is the science of epidemiology?

A. Okay. The next slide. Epidemiology, the root word comes from epidemic, which is an unusual outbreak of disease in a population. And epidemiology is the study of the distribution of diseases, and of the causes or exposures in human populations, and it is done principally to understand or to discover the causes of disease in humans.

Q. When epidemiologists do studies, what in the first instance are they looking for statistically?

A. Well, as I pointed out in previous slide, when you do analytic epidemiology to discover causes of disease, you're looking for associations between the causes or the factors and risk of disease.

Q. There's a manual for judges by the Federal Judicial Center called the "Reference Manual on Scientific Evidence", it helps define terminology. Have I shared with you the definition of "association" from the manual?

A. Yes.
Q. Could you explain it to us, please?
A. Yes.
Q. Read through this for us and explain in scientific terms what this is saying.
A. Right. Okay. First off, I agree with this. This is right on target. So an association reflects the degree of statistical relationship between two or more events or variabilities. So between an exposure and a disease risk. Events are said to be associated when they occur more or less frequently together than one would expect by chance.

Now the critical element of that statement is the "more or less frequently together than one would expect by chance". The mere fact --

Q. Why is that important?
A. Well, the mere fact that I've seen a patient with an unusual genetic abnormality who has some unusual disease, is not an association. Because there is no way from that case report to assess how commonly that mutation and that disease occurred together by chance alone.
Q. Have epidemiologists developed statistical methodologies to help find out whether an association is something that's more frequent than one would expect by chance?
A. Yes. In fact, statisticians have developed the theory behind that, and epidemiologists use it universally.

Q. Are there -- what are the two kinds that are the most frequently discussed in the literature?
A. Yeah. We routinely calculate either P values. Which is the probability which you could have seen the association you saw by chance alone; or we calculate confidence intervals. By convention we use the 95 percent confidence intervals. We all see them in the newspaper and on the news every time there's an election and someone says, well, recent polls says 52 percent of the voters intend to vote for Candidate A, with a margin of error of 3 percent. That margin of error is the pollster's way of saying confidence interval.
Q. Are there types of studies epidemiologists have developed in order to determine whether there's a statistically significant relationship?
A. Well, Mr. Schachter, let me separate that question into two separate issues. The first is to look for an association and to determine whether there is an association or not. The second is to evaluate the role of chance as a possible explanation for that association.
Q. Okay.
A. So those are related but separate actions which you have -- and you're responsible to do both as a scientist.
Q. Thank you for that clarification.
If you find an association, does that necessarily mean that you have a causal relationship?

A. No.
Q. Why not?
A. Well, there are a number of reasons associations occur that are not causal. The first is, they're just chance.
Q. Okay.
A. You have to evaluate that. In epidemiology we group the other causes into basically two categories, bias, some systematic error in the design or conduct or analysis of the data, and the other is confounding.
Q. What's confounding?
A. Refers to the existence of a third variable.
So you're looking to see whether there's an association between A and B. In other words, you know -- the idea is, does A cause B. There's some other factor C that is also a cause of B, that is associated with A.
Q. Okay.
A. If you don't adjust for factor C in your analysis, you can get the wrong answer and attribute the association between A and B to represent a causation when it's actually due to confounding by C.
Q. Okay.
A. So you have to look for and evaluate confounding, before you can reliably conclude that the association between A and B is meaningful with respect to causation.
Q. Sir, the reference manual defines several types of

studies, and I've got a diagram I've taken from the reference manual. What is a cohort study, sir?

A. Cohort study refers to the design that is laid out on this slide. You start with a defined population, and within that population you identify the group that has the exposure you're interested in, and the group that does not have the exposure. You then follow both groups over time. For cohort studies if you're doing cancer epidemiology that's typically decades. And as time passes, you watch to see how many people develop disease in the exposed group, and how many people develop disease in the non-exposed group.

If we might go on to the next slide, I would like to talk a little more about that.

Q. Do these cohort studies permit the determination of whether there's a statistically significant association?

A. Again, I need to break that down into, they allow you to look for evidence of an association. And if you see one, you then must evaluate whether it is statistically significant.

Q. Okay.

A. Two different steps.

Q. All right.

A. Could I come down to --

MR. SCHACHTER: Your Honor, may the witness be --

THE COURT: Sure.

THE WITNESS: Okay. In the previous slides we

talked about dividing the population into an exposed group and non-exposed group. And then we followed both groups over time. And as time passes, we look for the occurrence of disease. And so I've indicated the occurrence of disease here with the purple boxes.

We then look at -- we then can calculate a rate of disease, which is the number of occurrences of disease, but divided by the person time experience of the population.

And so I've actually put just 12 here to indicate 12 people. But in fact what we do is we tally up the person time experience. How many 100,000 person years of observation there are in the denominator. The denominators are important.

So if you have two cases of cancer in 100,000 people followed for a year, that is a disease rate of 2 per 100,000 or 2 times 10 with a minus 5th. And in the control group -- or excuse me, in the non-exposed group, you also can calculate the disease rate as the number of occurrences divided by the number of person years of observation.

To calculate a measure of association, we routinely take the ratio of what happens in the exposed group. So let's say 2 per 100,000 person years, divided by what happens in the non-exposed group, 2 per 100,000 person years.

When the experience of both groups is identical, the ratio is 1 and that means there's no association. In other words, the exposed group did not have a higher rate of disease

than the non-exposed group. The rates are identical, the ratio is 1.0.

Q. All right. What happens if you have a different set of data from this it --

A. In this example, let's say 8 people got the disease in the exposed group, and 2 got it in the non-exposed group. And so if our denominator was instead of 12, it was 100,000 person years, we would say the rate is 8 over 10 to the 5th, versus 2 over 10 to the 5th. The ratio is simply 8 over 2 or a four fold association.

In other words, the disease rate in the exposed group is four times the rate in the non-exposed group, we would say that is a four fold association. That's a positive association.

Q. That's how the statistics are done for a cohort study?

A. That's how you calculate a measure of association for a cohort study.

Q. All right. Now, the other type of study that's mentioned in the reference manual is a case controlled study. Does it differ in design from a cohort study?

A. Yes, it does.

Q. How is a case controlled study designed?

A. All right. Well, first off, the goal of doing a case controlled study, is the same as the goal of doing a cohort study. You want to see whether there is an association

between exposure and disease.

All right. We design it a little differently. We go out and identify cases of the disease. All right. So you have to work with a system of hospitals or a tumor registry or the registrar of the death certificates, and let's say you're interested in mesothelioma. You go out and assemble 200 or 500 cases of mesothelioma.

You have to have a comparison group, and that's called controls. These are people who do not have mesothelioma. And typically they should be drawn from the same population that gave rise to the cases. And they should represent the person time experience of that population.

So now you're going to compare people with the disease, to people who do not have the disease, who are representative of the experience of the same population.

You then go back and reconstruct in an identical manner for cases and controls, their past exposure history. So you want to identify among the cases, how many have the exposure of interest among the controls, how many had the exposure of interest, you want to know at what age it started, how frequent it was, for how many years it lasted, perhaps some gauge of the intensity of the exposure. And you're going then to have to compare the exposure history of the cases, to the exposure history of the controls.

If I could have the next slide.

Q. Yes, sir. All right. What did you do with the data at that point?

A. So this is my diagram. You want to calculate a measure of association. All right. So here -- whoops, you're a little fast.

Q. Sorry.

A. Okay. So here I have my cases again. I've just made a diagram of 12 of them. They all have the disease. Here are my controls. None of them have the disease.

Next slide.

Now we go back and ask them, or look at their work records to find out how many had the exposure. I've indicated exposure with darker green figures. So among the cases, let's say four had the exposure, eight did not. We calculate the exposure odds.

Okay. Anyone who has ever bet on a horse race or a basketball game knows what odds are. It's the number of times you get what you want, divided by the number of times you get what you didn't want.

Okay. So we say, okay, among the cases, four had the exposure, eight did not. The exposure odds is .5. Among the controls, two had the exposure, 10 did not. The exposure odd is .2.

We then compare the experience of the cases to the experience of the controls by taking a ratio. It's an odds

ratio. So the odds in the cases divided by the odds in the controls, and in this example you can see it's a 2.5 hold odds ratio. That's a positive association.

What that means is, the cases were two and a half times as likely to have the exposure, as were the controls. That is a measure of association.

Q. We've had cited in the expert reports and we'll hear about lots of studies. Do they have a standard way of reporting the results? Can you explain to us what that is and how it's represented?

A. Sure. Regardless of how you do your study, it's customary in epidemiology to represent the measures of association in the same manner.

So 1.0 means no association at all. Greater than 1 is a positive association. Less than 1 is a negative or inverse association.

We typically write down the measures of association as relative risks or risk ratios, odds ratios, rate ratios. Different studies have different terminology, but they're all scaled the same way.

So we would write down the relative risk 3.1, and then we would calculate the confidence interval by convention, a 95 percent confidence interval. In this instance, 2.3 to 4.2.

We customarily graph them. It's easier to see the pattern in the data in a graph than it is from looking at

numbers.

The graph I put up here, the blue square represents the relative risk or the measure of association. The black bar above and below it represents the 95 percent confidence interval.

Okay. When you have a bunch of studies, you graph them all. So the first one is graphed above, the second one with the relative risk is 1.5, and your confidence interval goes from 2.8 to 2.7 is graphed here.

Q. Now the first study, Study One, is that a statistically significant study as epidemiology understands that notion?

A. Yes. And you would click.

Okay. When the lower confidence interval is above 1, that was a statistically significant finding. And the concept is this, the data said there was a 3.1 fold association. We're -- we're 95 percent confident that the truth lies in the range defined by the confidence interval. Values outside of that confidence interval are not reasonably compatible with the data we saw.

Okay. So a value of 1, that is outside of the confidence interval, says that 1, no association is not compatible with the data we saw.

And if you did the calculation of the P value on the same set of data, you would find that the P value is well below .05. You would say that's a statistically significant

finding.
Q. What about Study Two?
A. When the confidence interval includes 1, what that's telling you is that 1.0, meaning no association, is reasonably compatible with the data we saw. That is not a statistically significant result because the confidence interval is 1.
If you did the P value calculation, you would find that the P value was greater than .05.
Q. All right. Sir, is there a way to accumulate the data from many studies on a subject, to come to a conclusion about the question in interest?
A. Yeah. Don't go ahead yet.
Yes. So what we do is, we typically graph them. Then we make a summary calculation that basically takes a weighted average of all of the relative risks, where the weights are proportional to the study size. Big studies have a lot of data, they have a lot of weight. Little studies have very little data, they have very little weight.
And we also account for the differences in the variances in the studies to come up with a summary relative risk which we refer to as meta relative risk. It's a weighted average across a bunch of studies.
Q. And the studies that do that, what are they called, sir?
A. Those are called meta-analyses.
Q. Thank you.

Do you have an example that's related to mesothelioma of how studies can or cannot tell us whether there's a significant association?

A. Yes. You go to the next slide.

All right. This is a slide that summarizes the world's literature on cigarette smoking and risk of mesothelioma.

So there are about a dozen studies that have looked at this. McDonald in 1970 found that the relative risk was .56, running .37 to .85. So that's a significant inverse association.

McEwen in '71 .5, not statistically significant.

You can glance down the list and see that the results vary, both above and beyond 1. Not very far away from 1. Look at the scale here .1. That's a 1/10th risk. Ten, that's a 10-fold risk.

Q. That's a logarithmic scale?

A. That's a logarithmic scale, right.

Q. Okay.

A. So 1/10 is the same distance from 1, as 10 is from 1.

Q. Does this slide give us a meta relative risk for the association between smoking and mesothelioma?

A. It does.

Q. And what is that?

A. At the bottom the meta relative risk is calculated -- it's actually calculated in two different ways. For this one

the correct answer is here. So if you take a weighted average of all these relative risks, the weighted average is .94. It's almost identical to 1, and the confidence interval goes from .83 to 1.07. What this says is, there is no association between smoking and mesothelioma risk.

Q. Now sir, cigarette smoke from a medical standpoint, does it contain carcinogens?

A. Yes, it does.

Q. Are those carcinogens capable of causing genetic errors in human cells?

A. Yes.

Q. Do the carcinogens in cigarette smoke, reach the pleura, the site of origin of pleural mesothelioma?

A. Yes, they do. Black soot accumulates on the pleura in smokers.

Q. So if all that's true, doesn't that establish that cigarette smoke does cause mesothelioma?

A. Well, Mr. Schachter, you've got a hypotheses. Here's the data that tests your hypotheses. The answer is, the data does not support your hypotheses. This has been studied 10 times. These are very large studies, some of them, involving thousands and thousands of people. And the answer is, no. Your hypotheses is not supported by the data. It is not reasonable to conclude that smoking causes mesothelioma.

Q. And that's because of what?

A. Because of an abundance of epidemiological evidence that shows no association.

Q. Thank you, sir.

Now, have you applied these same meta-analysis methodologies to the issue of whether low dose chrysotile encapsulated products cause mesothelioma?

A. Yes.

Q. Okay. And in specifics, the product in question is what, brakes and gaskets?

A. Well, the occupation in which there is a low dose exposure to chrysotile, is vehicle mechanic. Because they handle brakes, clutches and gaskets, which have traditionally included chrysotile, in one or more formulations.

Q. Just as cigarette smoking has been studied, have vehicle mechanics been studied in many studies?

A. Yes, they have.

Q. Are you prepared to tell us about a few of them and the types of studies they are and who funded them?

A. Yeah.

Q. Issues like that?

A. Yeah. These slides go on for a number of pages, and I will not belabor them. I will talk quickly about a few of the studies.

What I've listed is the author, the year it was published and who funded it.

Okay. So the first was by Alison and Corbett McDonald published in 1980. It was a large case controlled study. In fact this cages all case controlled studies. And they look to see whether there was an association between mesothelioma and work in vehicle garages in North America. This was Canada and the United States.

They found the odds ratio of .91. Confidence interval .35 to 2.34. So the association was almost exactly 1, not significant -- not statistically significant.

The second published study by Mary Jane Teta at Yale in 1983, with funding from the National Cancer Institute, looked at the mortality data for the State of Connecticut and tallied up the occupations of mesothelioma cases and controls.

She found an odds ratio of .65, not significant.

Robert Spirtas at the National Cancer Institute. Funding, of course, from the National Cancer Institute. Big case control study of mesothelioma looking at the association between brake lining installation, or repair. No association. He didn't give all of his numbers, but his data was later analyzed by Pat Hessel, and was reported in detail.

Q. Let me ask about that Spirtas. Are those the numbers that Spirtas reported or the reanalysis?

A. No. These are the numbers reported by Dr. Spirtas in 1985.

Q. Okay.

A. I'm not going through all of these. The point I want to make is that these studies have been done now over 33 years in the United States, in Germany, in British Columbia, Canada, in Spain. And as you look at the column of odds ratios, you see that they are all pretty close to 1. There are no statistically significant positive associations.

Next slide.

Q. Just a second, I have a question if I may.

A. All right.

Q. You mentioned QAMA, what is that?

A. The Quebec Asbestos Mining Association. Dr. McDonald's work was supported by the Quebec asbestos industry.

Q. Any of the other slides on that list, supported by anybody associated with industry or asbestos manufacturing?

A. No. These other five studies were all supported with government funding.

Q. Thank you. Now on the next slide, have you listed further case controlled studies that have looked into this issue of whether vehicle mechanics are at an elevated risk of mesothelioma?

A. Yes. Yes. Okay. So just pointing out that Denmark, United States, Great Britain, France, Mexico, the odds ratio is .7, .8, .4, 1.5, but not significant. And Anguilar-Madrid did the study, but didn't point out the odds ratio or the confidence interval.

As I mentioned earlier, Pat Hessel reanalyzed the Spirtas' data with a grant from Ford, GM and Chrysler, that's the only other industry-funded study. This is not data he collected, but he analyzed in detail, whether working with brakes was associated mesothelioma risk and it was not.

Q. All right. Are there any cohort studies that have addressed this issue?

A. Yes, there are four. Lesley Rushton in the United Kingdom studied the municipal bus garage maintenance men in London. Did not report active data, however.

Eva Hansen in Denmark studied the cohort of auto mechanics. Found one mesothelioma. Did not report out the odds ratio, confidence interval.

Gustafsson in Sweden studied bus garage workers in Stockholm, did not report the results.

Merlo in Italy, three years ago, municipal bus maintenance workers in Genoa. Found the standardized mortality ratio 1.27 not statistically significant.

Q. Okay. When they don't report out the data, can you use it in a meta-analysis?

A. Sometimes you can make reliable calculations, sometimes you cannot.

Q. Okay. For the data that you told us about, the case control, the cohort studies where there is a report of statistical association, the two types of studies mentioned in

the reference manual, what does the summary data look like?
A. So here are the studies, the same ones I've mentioned, McDonald, Teta, Woitowitz, Teschke, Agudo, et cetera. The meta relative risk is .96, almost exactly 1. Confidence interval .72 to 1.28. So there's no association.
Q. All right. Are there other types of studies that have data that bears on this issue, sir?
A. Yes. There are also what are called registry studies, essentially cancer registry studies that have data that is of some value, although it's not as useful as case control and cohort studies.
Q. Why is registry data not as useful as case control or cohort studies?
A. Registry data doesn't have denominators. So when you're talking about cohort studies and we talked about calculating disease rates, as cases per person years of observation, cohort studies have that, registry studies don't.

What registry studies have is reports of cancer. And so they will typically ascertain all cases of cancer in a state or in a nation, and report them out. You don't have any denominator of person years of experience. So you are forced to make what are widely regarded as less reliable calculations, such as proportional mortality ratio or standardized mortality odds ratios, without being able to actually calculate disease rates.

Q. Okay. Even though those are on a lower level of, I guess, hierarchy in epidemiological studies, have you taken those that report information that can be used into account?
A. Yes.
Q. Tell us about a few of those studies, sir?
A. Okay. These are the registry studies that there's actually two pages of this. So registries using the Swedish National Cancer Registry, the Mesothelioma Registry in the United Kingdom, repeated reports from that. Our own National Institute for Occupational Safety and Health using death certificates in the National Occupational Mortality Survey.

And some of these studies did not report out any measure of association, three of them did.

So Coggon, proportional mortality ratio .46, a significant deficit of inverse relationship.

McElvenny also in Great Britain and update Coggon earlier. PMR .48, almost the same answer. In the United States .83, not statistically significant.

You can go to the next slide.

Q. Just a second. Let me ask about this.

Are any of these studies funded by industry or anybody associated with the asbestos manufacturing?
A. No.
Q. Okay. And the other studies?
A. Okay. More recently, that British Health and Safety

Executive, essentially an update of the dataset reported by McElvenny, but not overlapping so it's an independent observation. Same answer .49, .73.

This is the State of Washington, same analyzed death certificates over the entire state of a 50 year period. PMR .73, not significant.

Then Roelofs just came out a few weeks ago using the Massachusetts Cancer Registry, found a statistically significant association standardized mortality odds ratio of 2.1. Confidence interval 1.1 to 4.0.

Q. And the other studies you talked about have a PMR. What's that, just so we have the terminology right, sir?

A. That's a proportional mortality ratio. Essentially what you're doing is saying among cancer -- among mesothelioma -- among mesothelioma deaths, what proportion -- I'm not saying it right.

It's essentially comparing the proportion of deaths that are mesothelioma among motor vehicles mechanics, to the proportion of deaths that are mesothelioma in all other occupations. So it's a comparison of proportions, there's no denominator.

Q. What's the SMOR?

A. Standardized Mortality Odds Ratio. A similar calculation, essentially comparing the proportion of deaths among mesothelioma who have worked as automobile mechanics, to

the proportion of deaths among some other causes of death who have worked as automobile mechanics.

Q. When we put the registry study data in with the case control and cohort study, how does that alter the picture if at all?

A. Well, you can see that all the case control cohort studies are listed, now we've added the registry studies, so there's more data.

The correct meta relative risk is the lower one. And answer is .87 is not statistically significant. The confidence interval goes from .66 to 1.6. So there is still no association between work as a motor vehicle mechanic, and risk of mesothelioma, even though there is one statistically significant positive study now.

Q. Thank you, sir.

Have you performed similar analysis for us in this case dealing with other professions?

A. Yes.

Q. Have we got a few slides that just summarize them? They're in detail in your report, right?

A. Yes.

Q. Well, let's starts with plumbers and pipefitters, it's an occupation where people use gaskets. Have you looked at the world literature on that, looking for the case controlled studies, the registry studies in exactly the same way?

A. Right. Case control, cohort and registry studies. There's quite a bit of data on plumbers and pipefitters, I don't know, maybe 20 or so studies.

The summary or meta relative risk is almost five, 4.95 is highly significant. A confidence interval 3.83 to 8.39. You can see that that is significantly different from the no association mark. So plumbers and pipefitters -- and this is all over the world, are at about a five fold risk of mesothelioma.

It's -- you can look at the data from the individual studies and see that all of them show positive associations, and almost all of them show statistically significant positive associations.

Q. Are -- I guess one criticism that sometime's rendered about the brake studies is that there are studies that cannot detect a significantly significant association if that exists, is that accurate?

A. No, that is not accurate. The studies that have found the significant association for plumbers and pipefitters are the same studies. So it's the Teta studies, the Spirtas, the Coggon, the Teschke, the Agudo, the McDonald, the Health and Safety Executive, Peto and Rake, Rolland, National Occupational Mortality Survey and Washington State Department of Health Sam Milham, as well as Carl Roelofs.

So these studies have adequate power, many of them, to

find statistically significant associations when they exist, and they have reported them. They did not find those associations for motor vehicle mechanics.

Q. Let's just do a couple more briefly. We have limited time in our case, I apologize. What did you find for boilermakers?

A. Boilermakers, the meta relative risk is about 4.5, highly significant, by eight or nine studies. Same authors, Spirtas, Coggon, Teschke, Rolland, et cetera.

Q. Now, when you did have data about an occupation from a different study, you of course included it; is that correct?

A. I'm not sure I understand.

Q. Well, you said the same studies. Some of these studies did not have data on brake workers, right?

A. That's correct. So for example, Danielson didn't cover brake workers. Pan, don't remember. Tomioka I think covered brake workers.

Q. What about shipyard workers, what's the relative risk?

A. Shipyard workers, five fold meta relative risk, highly significant. Almost every study shows a statistically significant positive association. Same authors. Same research studies reporting these out as we saw for brake workers.

Q. Electricians?

A. Electricians lower risk 3.2, highly significant. I might

mention a 3.2 fold risk is still a strong risk factor. I don't -- I try not to do things that put me at three fold risk for cancer. That's a big one.

Many studies, many statistically significant findings, three fold risk. Same authors, same papers.

Q. And how does this fit into the issue of exposure to insulation products? Why --

A. Well, electricians routinely work in the construction industry, and they routinely, in the past, have to crawl around up in the plenums, up among the insulation. And they have to remove the insulation to run their wires and bore holes in walls to stream wires. And so they often have exposure to thermal insulation. And so as part of construction trades, they often end up being exposed to thermal insulation, not to mention the electrical equipment is often insulated as well so it doesn't catch fire.

Q. In your report did you conduct a similar meta analysis for each of these occupations, sir?

A. Yes. This is a slide we showed yesterday afternoon. Now we have a little better background about what this actually represents. So these are the meta relative risks for each of about 30 different occupations. Showing in their rank from high to low. Showing that the people who are exposed to thermal insulation, such as insulators, shipyard workers, plumbers, pipefitters, boilermakers, sheet metal workers

electricians, furnace operators, et cetera, are at high risk of mesothelioma, in contrast to vehicle mechanics who are not at any significant risk of mesothelioma. And in terms of risk, look just like teachers and office and clerical workers.

Q. Sir, I see carpenters are listed here a couple of times. Can you explain why?

A. Yeah. We separated out carpenters in Great Britain and Australia, from carpenters in other areas in Europe, and carpenters in the United States.

Q. Why is that?

A. And the reason is the building codes in Great Britain, as I understand them, for years required the use of asbestos insulation board. That was an amosite board.

And so carpenters routinely cut and built things with AIB as they call it, asbestos insulation board. It was amosite exposure. And so we do separated out British and Australian carpenters from the risk. And the risks appear to be different. Certainly comparing U.S. carpenters to British carpenters.

Q. All right. Sir, is there another scientific discipline to which your data, another set of data to which your epidemiological data can be compared that may corroborate or not corroborate what you found? I'm referring to this.

A. Thank you.

Q. I'm sorry for my bad question. I'm not a scientist.

A. All right. Yeah. The next thing we did was, we looked to see whether these meta relative risks that we calculated across occupations, correlated with lung fiber burdens of amphiboles. And the group at Duke, Roggli and Sporn (phonetic) have published the lung fiber burdens in a list of occupations in the peer-reviewed literature. So we took that evidence of lung fiber burden by occupation and plotted it against our meta relative risks that I showed on the previous slide.

Q. What did that show? What are the scales here?

A. Okay. On the horizontal scale, this is the amosite and crocidolite fiber burden per gram of lung tissue. It's on the log scale. And on the vertical scale, this is the relative risk also on the log scale. When you plot them on the long log scale, you can get a reasonably good linear fit using linear regression.

What it shows is a positive association. It is statistically significant with a P value of .02, and a reasonably good R square, which is a measure of how much of the variation in the Y axis is explained by the fit.

And so what it says is, there's a significant correlation between lung fiber burden of commercial amphibole fibers, and relative risk of mesothelioma across a wide range of occupations. The highest risk occupation, insulators, also has the highest lung fiber burden. When we get down here to

vehicle mechanics where their relative risk is slightly below 1, they have very little amphibole in their lungs, they have the lowest.

I'm sure everyone remembers that the log of 1 is zero, that's why on the log scale is zero with a risk of 1. Okay.

Q. Thank you, sir. I have a few discrete questions about your vehicle mechanic studies.

I noticed that none of the studies that are included are case reports; why not?

A. You can't include case reports because you cannot calculate a measure of association from a case report. And you cannot calculate -- since there's no measure of association, you can't calculate a confidence interval or a P value.

Q. Is there an example in the literature on vehicle mechanics that illustrates the proper use of a case report and how that is followed up?

A. Well, there are case reports in the literature if you go to the next slide.

This is a case report by Arthur Langer in 1982 where he wrote up a case of a mesothelioma in a brake repair worker. So it's a case report it raises a hypotheses that brake repair work might be a cause of mesothelioma.

Even then he commented, the risk of malignant asbestos disease among brake maintenance and repair workers seems to be

low, but mortality data has yet to be fairly evaluated. This is 1982, the only published available study at that time was McDonald in 1980. So this was correct, didn't know the answer.

Q. Did he write later on it after some research had been done?

A. Dr. Langer in 2003 published a paper looking at the biological potential of chrysotile asbestos to cause mesothelioma and other diseases, and now commented, having reviewed some of the epidemiology brake installers and maintenance workers appear to exhibit no increased risk of mesothelioma, and went on to say, proportional mortality studies in groups of workers engaged in automotive brake repair have shown that the cancer deaths and for mesothelioma specifically, were equal to or less than values calculated for their respective control groups.

So the point is now, after collecting data that can test the hypotheses raised by the case report, the data doesn't support the hypotheses.

Q. Sir, I need to you ask a little about your Goodman article. This was how long ago?

A. Nine years now.

Q. And this article did what, sir?

A. My colleagues and I published a meta-analysis of mesothelioma and lung cancer among motor vehicle mechanics.

It was very similar work to what I just presented just a few minutes ago.

Q. And there's a quality scale that appeared in that report. Can you explain to us why in doing a meta-analysis, it's important to analyze the quality of the studies upon which you're relying?

A. Yeah, in doing a meta-analysis, it is important to evaluate the quality of the individual studies. That's one of the recommendations in the scientific community, that you want to focus on studies that appear to be more reliable, rather than studies that are less reliable data, and less reliable methods.

So when we did the study nine years ago, I'll just refer to it as the Goodman study. We had a 10 factor quality scoring system. And we rated each study on their quality.

You can see here I've represented the minimum score you could get a minus six, and a maximum a positive eight. So it was a scoring system that was centered close to zero, although it wasn't intended to center on zero, doesn't matter. The point is, you could get points or lose points for each of 10 different study design factors.

Q. All right. And so your quality scoring rates are in the Goodman article, and I believe that there's some comment by committee experts on that. I just want this to be clearly understood. Have you also assessed the quality of the studies

appeared since Goodman included in the analysis that you presented to the court today?

A. Yes, I have.

Q. And does this reflect those scores?

A. Right. So these are the studies published since the Goodman article. And I have scored them, the Rake study in fact has the best score of any study in the literature, it got a six. It's a very well done study.

Rolland and Merlo. Rolland was case control, a one, Merlo a three. Then the two registry studies got a minus one.

Q. All right. And is it -- is there material even in the registry study like the recent Roelof study that helps explain why it's not of the same caliber as a case control study such as Rake and Peto?

A. Yeah. Roelofs suffers from one of the problems that is typical of registry studies. What she knew about the occupational history of the mesothelioma cases was simply whatever they reported at the time of diagnosis to the hospital.

So when you go into the hospital they often ask you, what sort of work do you do; where do you work. That's what she had. So that's not the same as a lifetime occupational history or a history that probes for exposure to asbestos in the past.

Q. And so when this says the major limitation of a cancer

registry based surveillance strategy, is that recorded usual occupation and occupation is a limited surrogate for detailed exposure history. Reported usual occupation and history may miss or mask the true source of asbestos exposure. What are we talking about here? If somebody comes in and tells the hospital, look, I was a brake worker. Why isn't that enough?

A. Correct. So -- so, you know, you're in the hospital. You're getting worked up for pleural effusion. They ask you, what sort of work do you do. You say, I'm a vehicle mechanic. Theres' nothing here that might have captured that you might have spent four years in the Navy in a boiler room.

Q. I see.

A. Or something that you did early in life, this would miss it.

Q. All right. Now, as opposed to this, the study that you scored very highly was Rake and Peto, what kind of information was that based on?

A. Rake and Peto were much more rigorous in getting occupational and non-occupational exposure histories. So this is what they did for both their cases and controls, they sent them a pre-interview postal questionnaire requesting a lifetime occupational and residential history.

They then did a telephone interview which inquired in detail about that history. Also got questions on smoking history, do it yourself activities, possible environmental

exposures, cases were asked about various asbestos exposures in each job, depending on the type of work. These included work with asbestos insulation board, lagging, spray coating, cement insulation, deep protection, gaskets, textiles and brake linings. For each job, the duration, description and occupational code were recorded, together with the frequent of direct or bystander asbestos exposure.

This is a careful and thorough exposure history. That's not what you get from registry studies.

Q. Some of the experts for the committee will opine on low dose exposure products like brakes and gaskets based upon -- I'm sorry. We already had the conclusion from Rake and Peto, right? They found no association, right?

A. Yes.

Q. I'm sorry. There's a study called Iwatsubo. Can you explain to us what that study was, and why you don't really use it to determine whether gaskets are a problem?

A. Okay. Iwatsubo was case a controlled study done in France, that became the basis of what eventually turned into a very large analysis -- turned into a large registry of mesotheliomas in about 25 percent of the French population.

Iwatsubo had -- so essentially what they had was cases of mesothelioma and controls who did not have mesothelioma. They had no measurements of asbestos levels in any job or in any setting. So instead of using measured levels, they made

estimations of likely exposures based on experts who made subjective estimates and assigned weighting factors to probability of exposure, frequency of exposure, and estimates of concentration.

That weighted index that took into account probability, frequency, concentration and also the duration of each person who reported exposure, they expressed in terms of fibers per milliliter years, but they put in quotation marks, because it really wasn't based on any measurements, and they did not represent that they actually knew what the concentrations were.

Q. Okay. You mentioned it was ongoing. Is there a study from the same basic population in the area and authors that is more probative of brakes and gaskets and low dose products?

A. Well, I should point out that Iwatsubo actually had information on brake mechanics, but they didn't report out any measure of association.

Q. Okay.

A. This was followed up by a much larger study which has now been published by Rolland. And if you look at the authors, many of them are the same as on the Iwatsubo paper. And so this now became a multi-center population base case controlled study within the French Mesothelioma Registry, and this reported data from '98 to 2002. It covers about a quarter of the population of France now. We go on.

Q. Okay. And they reported meta -- relative risk?
A. This is not meta-analysis.
Q. I'm sorry.
A. They reported the odds ratios for each of the long list of occupations from their case control study.
Q. They used the same kind of chart you used in the court?
A. Well, they represented them in the same manner. This is fairly customary. So you have the odds ratio with the confidence interval above and below it. And then the odds ratio numerically and confidence numerically at the far right.

The statistically significant associations are in bold type. The non-significant ones are in the faint type, which means you can't read them. But motor vehicle mechanics are right here. And so here are the results for motor vehicle mechanics. You can see it's not significant. The odds ratio is 1.5. Confidence interval .76 to 2.95.

This result is in the meta-analysis that we -- that I showed you just a few minutes ago.

Q. All right. There's also a similar registry in Germany; is that correct? Oh, I'm sorry. You had a point you wanted to make about Rolland, what they talked about on brake mechanics when they wrote up the report, right?
A. Yes. They commented in this paper, nearly all male cases were end users of asbestos-containing materials, especially insulation products in several occupations or industries at

risk. In contrast, as reported elsewhere, they cite Teschke and Agudo. Occupational activities involving asbestos friction products repair of motor vehicles and motorcycles were not associated with significantly high risk of mesothelioma.

So these are the same studies that we saw in the meta-analysis that I created.

Q. And there's a German registry, right? And there's been reports from it too, correct?

A. That's correct. And there is a case control analysis based on those recorded mesothelioma cases. This was reported out by Rodelsperger. Of interest, in addition to doing the case control study, Rodelsperger also had autopsies on 66 of the mesothelioma cases, which showed a strong association between the amphibole fiber content in the lungs and mesothelioma risk, but no relationship for chrysotile.

Q. All right. Did this study, though, report on motor vehicle mechanics separately?

A. Well, Rodelsperger and Woitowitz reported on motor vehicle mechanics in a separate paper from the case control study.

Q. And that was the --

A. So this is 1994, Woitowitz and Rodelsperger, they found no evidence that car mechanics are exposed to increased risk of mesothelioma, even if they do brake repairs. But asbestos

exposure in other employment is an important confounding factor. So if there's a mesothelioma risk of car mechanics, it would be small it would not be detectable.

The point here is that if you're going to look at the association between mesothelioma and work as a car mechanic, car mechanics have often worked in other exposed jobs. People in mechanical skills often work as millwright machinists, they end up in an industry where they often have had exposure to thermal insulation products on other jobs. You have to control for that potential confounder to get the right answer.

Q. Thank you, sir. One other issue is this issue of idiopathic or just background rates of mesothelioma.

Has there been published literature that has addressed that issue, sir?

A. There's actually a substantial body of literature that has tried to estimate how much mesothelioma occurs in the absence of asbestos exposure. One of the best done studies was Spirtas, the same author we talked about, same study.

Q. Is he associated with industry in any way, this study funded by industry or anything like that?

A. Dr. Spirtas spent his career at the National Cancer Institute, which is part of the National Institutes of Health. No, he is not affiliated with industry to the best of my knowledge.

Q. Okay. What did he report in 1995?

A. He calculated what epidemiologists call attributable risk. In other words, what proportion of the cases are attributable to asbestos exposure.

For men with pleural mesothelioma, he calculated out 88 percent were attributable to asbestos. For peritoneal mesothelioma, it was 58 percent in men. For women, pleural and peritoneal combined, it was 23 percent.

So depending on sex and depending on site it various. His overall estimate for pleural mesothelioma was 88 percent. Which means that 12 percent had no known history of exposure to asbestos.

Q. And you mentioned there's been a lot of writing on this. Can you -- do you have a recent example?

A. Craighead and Gibbs in their textbook commented on this. Although -- this is page 191. Although a strong link between malignant mesothelioma and amphibole exposure is established, not all cases are etiologically related to asbestos. In the adult male population, 20 to 40 percent of malignant mesothelioma are idiopathic. And in women in the United States, the incidence of spontaneous idiopathic malignant mesothelioma exceeds 50 percent.

Q. Spontaneous mesothelioma means, it just happens?

A. It means it's idiopathic.

Q. Sir, your meta analysis, your report contained charts like the ones we've gone through. After your reports were

published, the Roelofs paper came out, right?
A. Yes. Roelofs just came out a few weeks ago.
Q. And did you update your charts to reflect that to include the data from Roelofs to the extent it was reported?
A. Yes. The charts that I have shown in slides today include Roelofs, whereas my report did not, as Roelofs was not available.
Q. I'm going to hand you GST Exhibit 15786, which are your updated charts. Could you verify that they are, sir?
I'll give a copy to counsel.
THE COURT: What was the number again?
MR. SCHACHTER: It's 15786. GST 15786.
THE WITNESS: Yeah. These are my updated graphs that include Roelofs.
MR. SCHACHTER: Your Honor, at this time I move the admission of GST 15786.
MR. GEORGE: We would of course object to its admission to evidence, understanding the court's ruling about using it for 104 purposes.
THE COURT: We'll admit it into evidence. Overrule the objection.
(Debtor's Exhibit No. 15786 was received into evidence.)
MR. SCHACHTER: Your Honor, just so the record is clear on the 104 submission of his report, I offer GST

15156 --

THE COURT: I'll admit the charts, we've been through those. The report we'll accept for 104 purposes.

MR. SCHACHTER: They are, to save time for further witnesses, can we just apply that to all of our reports?

THE COURT: That's fine, yes.

MR. SCHACHTER: And it would include rebuttal reports?

THE COURT: Yes.

MR. SCHACHTER: Thank you, Your Honor.

MR. FINCH: Your Honor, am I correct that the cross (phonetic) rule is in effect that we can put in our reports for 104 purposes?

THE COURT: Sure.

MR. SCHACHTER: Actually we attached all their reports too, so the court would have a complete record upon which to decide *the Daubert* issues. So they're already there.

Thank you, Your Honor. I pass the witness.

THE COURT: Okay. Cross examination.

CROSS EXAMINATION

BY MR. GEORGE:

Q. My name is Jonathan George. We've met before, correct, Dr. Garabrant?

A. Yes, we have. Good morning.

Q. I want to ask you really quick about this brake study.

You commented on the fact that through these phone questionnaires, the authors solicited detailed information about the job duration, description, frequency of asbestos exposure. None of that information with regard to any exposure to friction products is actually reflected in this study correct? There's no table that tells us how many of the interviewees had exposure to friction products? How many controls did, correct?

A. I would have to look at the technical report. Let me get it out.

Q. Now the technical report is not the published report that you put up before the court, correct?

A. Well, it's the accompanying technical report published by the Health and Safety Executive in Great Britain and it runs about 120 pages. Let me get it out and answer your question.

Q. Let me ask you this. My question is more specific to the peer-reviewed published report, the actual study itself which appeared in the *British Journal of Cancer* in 2009, ran pages 1,175 to 1,183. In that, there's no chart that tells us anything about the exposure that any of the mesothelioma patients had to friction products, correct?

A. The published report is eight or nine pages. You cannot publish all the detailed results in the peer-reviewed literature. There is a technical report that runs about 110 pages that gives far more detail. Let me get that out and --

Q. Respectfully, I'm not interested in that. I'm interested in the peer-reviewed published report.

If I was looking for a chart in here that told me how many cases, how many controls did brake work, and whether in fact it was actually brake work, or whether they were classified as some other occupation like a garage worker or a automobile mechanic or a motor vehicle mechanic, that information is not contained within the confines of this published report, correct?

A. There are two published reports. One by the government of Great Britain that is widely available. Anyone who reads the peer-reviewed published paper by Christina Rake is referred back to the full report for further details.

Q. So I am correct that in the peer-reviewed published report that information is not contained, correct?

A. The report published by Peto and Rake by the Health and Safety Executive I believe is also a peer-reviewed published report.

Q. Still not answering my question.

In the peer-reviewed published report by Peto and Rake, there is no table that tells us how much exposure any of the mesothelioma patients had to friction products, correct?

A. Sir, we're trying to separate out two peer-reviewed published reports on the same study; one is nine pages long, one is 110 pages long. If you want the details, you have to

go to the second one as well. You can't look at it just from the nine page summary.

Q. Now Dr. Garabrant, you talked about your CV. Out of your 185 peer-reviewed publications, only four of them have dealt with asbestos, correct?

A. I think only four of them mention asbestos in the title. There are a number of other studies that I've done and reports and papers I've written that have dealt with asbestos.

So, for example, my cohort mortality study of UAW Ford members, also looked at asbestos exposure in relation to cancer deaths. But there's nothing in the title that says asbestos.

Q. And in the four of your 185 peer-reviewed publications where it's mentioned in the title, you've essentially published on two issues with regard to asbestos. One is the relationship to colon cancer. And two is your motor vehicle study, correct?

A. No, sir. That's not accurate.

Q. Well, your first one was an Occupational Asbestos Exposure Mesothelioma Risk in Los Angeles County?

A. Yes.

Q. And that was just a job matrix exposure where you tried to figure out what the relationship was between jobs with asbestos exposure and the development of mesothelioma?

A. I would characterize it somewhat differently. I was at

USC School of Medicine at that time, and we sought to look at the Los Angeles County Tumor Registry data, which also had occupation and industry at the time of diagnosis in it.

And to see whether we could use that data and create an overall, what's called job exposure matrix to estimate exposure to asbestos in combinations of jobs and industries, to see if we could identify using the tumor registry data, occupations that had asbestos exposure that were at increased risk of mesothelioma.

So it was a very broad investigation into the uses of registry data and ways to use that data to find mesothelioma risks by occupation.

Q. And you ultimately concluded you couldn't use the data in that way, correct?

A. I wouldn't say we couldn't use it. We found that it was -- registry data has a lot of occupational misclassifications. It's difficult to get very strong associations out of that type of data. That's essentially what we found. It wasn't that we couldn't use it, it just didn't appear to be terribly useful.

Q. You didn't, in that study, reach any conclusion about friction product exposures or gasket exposures, correct?

A. I don't recall having done so, no.

Q. Your next two studies had to deal with colon cancer, correct?

A. Yes.
Q. And then your last study was the meta-analysis that you talked about on direct, correct?
A. Of the four peer-reviewed studies that mention asbestos, yes.
Q. Then you had two non-peer reviewed publications which were both essentially letters to the editor?
A. Yes.
Q. Now you don't have a Ph.D in epidemiology, correct?
A. No.
Q. You have a Master's degree, because you got your Master's in public health at Harvard, correct?
A. I have a Master of public health, and I have spent my career doing epidemiology, teaching epidemiology and studying epidemiology.
Q. Now, you would agree that you have no background in industrial hygiene?
A. Actually I took industrial hygiene when I was at the Harvard School of Public Health. I took a graduate course in it.
Q. But you're not a industrial hygienist?
A. I would not hold myself out as an industrial hygienist.
Q. You haven't participated in any studies that deal with an industrial hygiene of gaskets, correct?
A. I don't believe so.

Q. You've not published any papers involving the health consequences from the use of industrial gaskets, correct?
A. I have not.
Q. Now you have been involved in litigation since the mid 1980s, correct?
A. Yes.
Q. You, since 2002, you've been deposed about 174 times, and you've testified at trial about 36 times, correct?
A. I don't know if that's correct. But if you have taken that from my list of testimony, I will vouch that my list of testimony is correct.
Q. Okay. And you've testified on behalf of the petroleum industry in a dozen or so leukemia cases, correct?
A. I have testified in cases where it was alleged that products such as diesel fuel, gasoline, toluylene, xylene, paint thinner, mineral spirits caused leukemia because of traces of benzene in them. I have testified on behalf of defendants including the oil industry in those cases.
Q. Among those defendants, British Petroleum, Chevron and Exxon, correct?
A. BP and Chevron, yes. I don't recall having testified on behalf of Exxon.
Q. Now you testified on behalf of Mobile Oil and All Waste in a case involving death from exposure to toxic vapors at the mobile refinery, correct?

A. I'm not sure which case you're referring to.
Q. You've testified on behalf of Lockheed in a series of cases involving exposure to solvents at the Lockheed facility, correct?
A. I've testified on behalf of Lockheed in a series of cases alleging cancer related to trichloroethylene, yes.
Q. And you testified on behalf of Chevron in a case involving paraquat?
A. Yes. Paraquat is an herbicide -- it was used to clear weeds from highway right of ways. And yes, I testified on behalf of Chevron.
Q. You testified on behalf of Baxter and Health Port in a case involving an allergic reaction to latex gloves, correct?
A. Yes, I have.
Q. And you testified on behalf of Lincoln Electric and others, in the case involving exposure to manganese from welding rods?
A. I've testified on behalf of a number of welding rod defendants in cases that alleged that Parkinson's disease was caused by welding rods, which I don't believe is true. So yes I testified on behalf of the defendants.
Q. Now you also testified in asbestos litigation, correct?
A. Yes.
Q. In fact, the first and last time you testified for a plaintiff in a third party lawsuit where asbestos companies

were sued, was a colon cancer case in 1984, correct?
A. That is correct.
Q. You've never testified on behalf of a plaintiff in a mesothelioma case, correct?
A. I have not.
Q. And the first time that you testified on behalf of the friction product manufacturers in lawsuits, was sometime around 2001 and 2002, correct?
A. Yes.
Q. And at that time when you first testified, you had not published anything in the peer-reviewed literature about friction products and mesothelioma, correct?
A. That's correct.
Q. You were a co-author of a paper in 2004 about friction products, the one we talked about, correct?
A. As a co-author of the Goodman meta-analysis, yes.
Q. And that was a meta-analysis, although you didn't receive any funding for your participation in that, the other authors, the study was funded by Chrysler, Ford and General Motors, correct?
A. That's correct. I neither asked for, nor received any funds for my work from anyone.
Q. But since the time of that paper, you've testified in 15 trials on behalf of companies that made, sold or incorporated asbestos brakes or clutches, correct?

A. Yes.
Q. In fact, you've pretty much given the same testimony that you gave here, you've given in those 15 trials?
A. I should hope so.
Q. Okay.
A. It's based on the same scientific evidence that shows no association. Yes.
Q. And in those trials, the plaintiffs also brought experts who disagreed with your conclusions, correct?
A. There are people who disagree with my conclusions, but I would point out they have no scientific evidence that supports their opinions.
Q. And respectfully they would disagree with your statement regarding the foundation for their opinions, correct?
A. They have yet to show any epidemiologic study that's ever shown an association between motor vehicle mechanics and risks of mesothelioma.
Q. Now in trial, in depositions, you've been retained in asbestos cases by brake suppliers like Abex, Honeywell and Carlisle?
A. Yes.
Q. Car companies Ford, General Motors, Chrysler, Toyota, Honda, Mercedes, Volvo, Nissan, BMW and Volkswagen?
A. Yes.
Q. Truck and heavy equipment manufacturers like Caterpillar,

Mack Truck and John Deere?
A. Yes.
Q. And brake suppliers like NAPA, the National Auto Parts Association, Auto Zone and Pepboys, correct?
A. Yes.
Q. Now, your compensation with regard to your litigation, is that you spend about 20 to 25 hours per week on litigation issues, correct?
A. I think that's a reasonable estimate.
Q. And over the last five years, about 50 to 70 percent of your income has been derived from litigation activities, correct?
A. It varies year by year. In some years that would be accurate, yes.
Q. Since you're billing rate is about $625 an hour, that would result to around 15 -- 12- to $15,000 per week in income from litigation activities, correct?
A. Let me just do the math. Yes.
Q. Now you've testified in the past, you estimated that your income from 1986 through 2005 from litigation activities was somewhere between 3- and $4 million. You recall that, correct?
A. I don't believe I ever testified to that. Do you have a transcript?
Q. Sure.

MR. GEORGE: Your Honor, may I approach?

THE COURT: Yes.

BY MR. GEORGE:

Q. I want to turn your attention to some testimony from a case in California entitled Merle Sandy verse Asbestos Defendants, from December 6 of 2005. Do you remember participating in those proceedings?

A. Yes.

Q. That was a trial, correct?

A. Yes.

Q. You were before a jury?

A. I believe it was.

Q. And Mr. Chris Andresa, I believe, was the plaintiff's counsel in that case? Do you recall that?

A. Yes, I do.

Q. And on page 53, starting with line 2.

"Just so we can fix this then, 1986 was the first legal case; is that right?

A. To the best of my recollection I believe it was.

Q. Okay. Then that would be about 19 years ago, correct?

Then, roughly, because this was about 2005, correct?

A. Yes.

Q. So we're talking about the time from when you began in

1986 to the present, which is 2005.

Q. How much have you made over the years as a legal consultant, Doctor?

A. I don't know.

Q. Can you ballpark it for us?

A. Not with any accuracy, no, I would have to speculate.

Q. Would it be north of $1 million?

A. Yes.

Q. Would it be north of $2 million?

A. Yes.

Q. North of $3 million?

A. Probably.

Q. North of $4 million?

A. Could be.

Q. In excess of $5 million?

A. I don't know.

Q. That's what you testified at that time, correct?

A. And I made clear I would have to speculate. I don't know what those numbers are, taken incrementally up by 1 million, 2 million, 3 million, I gave my best estimates of what I was frankly guessing at. More than two; yes. More than three; probably, I don't know. That's what I really answered.

Q. Well, you can't give us a specific dollar amount. You agreed before a jury that from 1986 to 2005 it was likely that

you made more than 3 million, and could be as high as 4 million, correct?

A. The testimony stands for itself. I would have to speculate. I made that clear. As to what the numbers were, you got the answers.

Q. Okay. Now that was as of 2005. Since that time, 2006, you made about $300,000, correct?

A. I think that's a reasonable estimate.

Q. 2007, between 3- and 400,000?

A. I think that's a reasonable estimate, yes.

Q. 2008, 450,000?

A. That's seems a little more precise than I probably remembered. But if you put 100,000 plus or minus around that, it's probably accurate.

Q. If you testified to that in the Millwork case, you wouldn't disagree with that, would you?

A. My testimony in every case has been to the best of my recollection. If I said it, I'll stand by it.

Q. And the best of your recollection, year 2009 was between 200,000 and 300,000, correct?

A. I think your chart says 200,000, and 300,000, yes.

Q. 2010, 500- to 600,000, correct?

A. If that's what I testified to, I will stand by it.

Q. 2011, you told me in the deposition you did in this case, that you were doing between 600- and 900,000 for the last two

years, correct?
A. Yes.
Q. So that would be a total between 5.95 million to 7.85 million, if that math is correct, correct?
A. Well, remember half of what you're totaling there is based on the testimony and Merle Sandy where I said I would be speculating. Okay. So those are not accurate numbers. So about half of that you would have to say well, that's open to question.
Q. Well, the last seven years --
A. Having --
Q. You've made --
A. If I might finish.
Q. For the last seven years --
A. Sir, may I finish my answer?
Q. I didn't know you weren't. Excuse me.
A. Okay. Okay. So you're adding up numbers that I made clear half of it is based on a speculative estimate that covered almost a 20-year period.
Q. In that 20-year period your speculative estimate was between 3- and $4 million, correct?
A. No, it was exactly what I said it was. We just read it into the record.
Q. In the last seven years, you've made between 2.95, 2.95 million to 3.58 million, correct?

A. I think that is a reasonable estimate of the past seven years, yes.
Q. Okay. Now that doesn't include the billing for 2013, correct? We were just up to 2012?
A. That's correct.
Q. Now in 2013, just in this case, you, your company, has sent to the debtors in this case, Garlock, invoices in the amount of almost $140,000, correct?
A. Without looking at the invoices, I don't recall. But if you have pulled that from my invoices and those are the numbers, yes.
Q. Now that's not your total billing in this case. Because your total billing in this case from the time you were retained is $208,000, if those in fact reflect the invoices that we received?
A. Yes.
Q. Okay. Now in that, 42 hours of your time was spent talking to Mr. Harris, Mr. Schachter or somebody in the law firm, correct?
A. Again, I don't recall. But if that's taken from my bills, I will agree it is correct.
Q. So about $26,000 of your bills in this case was you discussing your opinions with these attorneys, correct?
A. No.
Q. Let me ask you this, for all that money, was there

anything that you told this judge today that is substantially different than what you've told juries over the last 15 times that you've been in court and in asbestos case involving friction product exposure?

A. I don't believe so.

Q. Now, you would agree with me that epidemiology is not the study of the cause of disease in people, correct? It's the study of the cause of disease in populations of people; is that accurate?

A. I'm not sure I understand your distinction there. Epidemiology is the study of the patterns of disease and patterns of exposure in populations of people. It is a foundational science to determine whether there are causal associations, which is essential if you're trying to make decisions about whether any individual person's disease was caused by an exposure.

Q. But epidemiology is not the study of an individual, it's a study of populations, corrects?

A. It always involves groups of people.

Q. In formulating your opinions about epidemiology and exposure to gaskets in this case, you did not incorporate the results of any in vitro or test tube experiments, correct, because that's not your field of expertise?

A. Again, I don't understand the thrust of your question. I'm not a toxicologist. I do not hold out that I have

expertise in toxicology or test tube experiments. So I rely on the epidemiology, which is the evidence from living human beings.

Q. You understand there's a whole body of science, there's literally hundreds, if not thousands of articles that have been published on the in vitro effects of the different types of asbestos on human and animal cells, correct?

A. I am aware that there is a literature on in vitro experiments that involved asbestos.

Q. There's also a whole world of literature with regard to animal experiments that have been done exposing them to the different types of asbestos out there and recording the results, correct?

A. There is indeed, although I don't know why you would rely on animal experiments when you have human evidence that is directly relevant to the questions at issue.

Q. Well, when organizations like the International Agency of Research on Cancer, when they answer the hypotheses, does a particular chemical cause a reaction? They look at in vitro experiments. They look at animal experiments. They look at epidemiology. They look at the totality of the evidence before they make a causal link, correct?

A. Yes. And with rare exception they will not decide that a chemical causes cancer in humans without sufficient human evidence, which means epidemiology.

Q. Now you talked about case reports. You're familiar with Harvey Checkoway, Neil Pearce, and David Kriebel's book entitled, *Research Methods for Occupational Epidemiology*?
A. Yes.
Q. Very well respected authors?
A. I know Harvey Checkoway and Neil Pearce for years. I know them personally, and think very highly of them.
Q. And this textbook is well used in universities where they're studying about epidemiology, particularly occupational epidemiology?
A. I don't know how widely it is used.
Q. In there they talk about case reports, and they say that certain conditions known as sentinel health events are so closely associated with occupational exposures, that the occurrence of any cases serves as an indication of an occupational hazard. And one of the examples they give is malignant mesothelioma, which they say is nearly always attributable to asbestos exposure. Do you agree with that?
A. Well, first off malignant mesothelioma is not nearly always attributable to asbestos exposure.

As we have seen, probably 80 to 90 percent of malignant mesotheliomas are attributable to asbestos exposure. There are some changing things in the literature.

For example, we now have quite adequate evidence to say that ionization radiation, therapeutic radiation,

specifically, causes malignant mesothelioma. I would say that was not known when Dr. Checkoway wrote his book.

Having said that, mesothelioma is strongly associated with exposure to amphibole forms of asbestos, yes.

Q. Now, ionizing radiation is a cause of mesothelioma in individual cases pretty easy to rule out if the patient has no history of therapeutic radiation, correct?

A. I would agree with that.

Q. If we looked at the world literature on how many cases that have been reported of ionizing therapeutic radiation causing mesothelioma, it would be a handful of cases, correct?

A. I don't know that that would be an accurate characterization. We would have to pull those studies out.

Q. If we looked at the world literature on how many cases of mesothelioma have been associated with exposures to asbestos, it would be literally tens of thousands, correct?

A. Yes.

Q. Okay. Now, you put up the case report that Dr. Langer did, mesothelioma in a brake repair worker, where they described a diffuse pleural mesothelioma in a man whose soul exposure to asbestos, was to the chrysotile form during brake maintenance and repair. That's what Dr. Langer reported, correct?

A. In 1982, yes.

Q. And in fact, they went back and they said this man for

many years worked in used car, tire and car repair businesses, since the age of 19. He had serviced automobiles, including the replacement of brake linings. They went back, and they said he had no history of construction or shipyard work or any other occupational contact with asbestos, and he never lived near any asbestos-fabricating plant. That's what they wrote, correct?

A. Yes. You have a case report, sir, a single case report.

Q. And a case report like this, the authors have the ability to spend the time to investigate the full circumstances of the plaintiff's exposure to the offending substance and look at the results, correct?

A. That is what this case report says they did. And I would point out that when that almost identical activity is taken out in a well-designed scientific study such as Rake and Peto did, they could find no association with work involving motor vehicle repair or brakes or gaskets.

Q. Now the difference between an epidemiologic study and a case report is that in a lot of epidemiologic studies, the authors either don't have the time, don't have the resources or don't have the ability to fully investigate the individual's total occupational history. Would you agree with that?

A. No, that's nonsense. That doesn't reflect an understanding of how epidemiology is conducted.

Q. What they did in this case, which they didn't do in Rake and Peto, is they actually got a piece of the man's tissue, and they put it under the microscope to see, hey, is there any evidence of his exposure inside his body. And what they found is, only chrysotile asbestos, no amphiboles were found, and they found asbestos fibers that were longer than we would expect to find in the ambient air so that they were probably occupational in nature. That's what they reported, correct?
A. That -- they said what you have put up there. The point is, you still have a case report. And what you cannot say from a case report, is whether there is any association or whether there's any statistical significance to the coincidence of a mesothelioma occurring in someone who did brake repair.
Q. Now we have a little bit more than coincidence in this case. We have a man whose only exposure to asbestos was to brakes. Where we've looked inside his body, and the only type of asbestos he has in his body is chrysotile, correct?
A. Well that's what these authors claim.
Q. And it's your position that this is an idiopathic mesothelioma that you don't know what the cause of this gentleman's mesothelioma is, correct, based on epidemiology?
A. It is my position that you cannot calculate a measure of association from this, and you cannot evaluate the role of chance. You have a single case report.

Q. Now there's about 165 of these single case reports in the literature, where authors have concluded that individuals have gotten mesothelioma from exposure to friction products, correct?
A. No. I think you've mischaracterized the literature on that point.
Q. Do you recall Dr. Lemen's paper, correct?
A. I do. And there's nothing in most of the papers that Dr. Lemen cites to where the authors claimed those cases were caused by brake work. He's pulled the cases from various case controlled studies that found no association.
Q. What I'm referring to, and you're familiar with this. It's called *Asbestos in Brakes Exposure and the Risk of Disease* from the American Journal of Industrial Medicine in 2004. The author is Richard A. Lemen. He has a Ph.D and an MSPH, correct?
A. If you're going to ask me about this, may I have a copy to look at?
Q. Yes.
THE COURT: Why don't we take about a 10-minute break here.
MR. GEORGE: That will be fine.
THE COURT: Let's come back at 25 after 11.
(A brief recess was taken in the proceedings.)
MR. GEORGE: Your Honor, may I approach?

THE COURT: Yes.

MR. GEORGE: (Handing paper writing to the witness.)

THE COURT: Proceed.

BY MR. GEORGE:

Q. When we broke, Dr. Garabrant, we were talking about Dr. Lemen's paper, *Asbestos in Brakes Exposure and Risk of Disease*. Now unlike you, Dr. Lemen has his Ph.D in epidemiology, correct?

A. I'm not sure what it's in. I don't know. I think my mike is off.

THE COURT: Can we turn his microphone on?

THE WITNESS: How is that?

THE COURT: Okay. Good.

BY MR. GEORGE:

Q. You do know that Dr. Lemen is a retired Assistant Surgeon General of the United States Public Health Service and the retired Deputy Director and acting Director of NIOSH, correct?

A. Yes. That's what his paper says.

Q. Now, when he investigated the literature regarding brakes and asbestos, he said that a review of the published peer-reviewed literature reveals at least 165 cases of mesothelioma in end product users of friction products. That's what he reported, correct?

A. That's one of the things he reported. He also made note that the epidemiology has been equivocal. If you go to page

233 I can show it to you.

Q. Now, if we went to the citations that he list there, it would show us in each one of those publications, their listing individuals who were exposed to brakes who got mesothelioma, correct?

A. Yes. Many of those publications are going to -- leave it up, please -- are the same ones that I have just shown. Sir.

Q. And many are not?

A. He lists the McDonald study. He lists the Woitowitz and Rodelsperger study, Teschke, Agudo, Milham and Osiander, all of which are studies that showed no association whatsoever between mesothelioma risk, and work as a brake mechanic. To mischaracterize those studies as supporting that there is an association is inappropriate.

Q. And respectfully, there are a lot of publications there that you didn't talk about where the authors found one, two, three, four, seven, or more cases of mesothelioma in individuals whose sole occupation was friction product work, correct?

A. No. Dr. Lemen relies on case reports. All of the other studies that are listed on that page 234, are case reports. Some of those case reports are wrong.

For example, he cites to the Australian Mesothelioma Registry, in which the principal investigator of that registry published a paper attributing cases of mesothelioma to brake

work, and said there was no other exposure. Under oath in a deposition he recanted and said that a substantial proportion of those cases actually did have other exposure.

So to characterize those case reports as evidence that brake work causes mesothelioma is not correct.

Q. Now you talked about how -- let me ask you this. There's a difference between brakes and gaskets, correct?

A. Well, to the extent I'm familiar with brakes and gaskets, yes. Brakes are used to stop a car, gaskets are used to provide a seal between two metal surfaces.

Q. And more importantly, when we talk about exposure, when we talk about brakes, the application of the brake, the pressure and the heat of applying the brake means that when the mechanic is taking compressed air to blow out that brake wear debris, less than 2/10ths of a percent of that dust is actually still asbestos, correct?

A. Sir, I have been in depositions a number of times in brake cases where the plaintiffs have claimed that they file and grind and arc grind brakes. That testimony I believe, is meant to establish that they have exposure to the chrysotile asbestos that has not been subjected to wear or degradation by temperature into forsterite.

In that sense, exposure to brakes and exposure to gaskets has some similarity, both are bonded asbestos products containing chrysotile. It is difficult to get substantial

amounts of chrysotile asbestos out of those products, unless you do something to machine them.

Q. Respectfully getting back to my question, you've been in depositions, you've read depositions of brake mechanics where their only exposure to asbestos is from blowing out the used brake dust in the wheel well, correct?

A. I have read depositions where plaintiffs claim their only exposure to asbestos was from brakes. I don't recall any where a brake mechanic said his only exposure from brakes was from blowing out the dust on the brake assembly.

They typically talk about opening the boxes, handling the brakes, arc grinding, hand grinding, sanding and filing the edges of the brakes, as well as cleaning up the brake assembly, either with a rag or a solvent or compressed air.

Q. So it's your testimony that one of the routine procedures that a brake mechanic would do is to grind brakes?

A. I don't actually believe that that is true, routinely. Modern brakes, to the extent I am aware of it, are made to fit the brake assembly without machining.

I will agree that historically going back to the 1950s, brakes were not necessarily made to fit and might have required manipulation. But modern brakes, as far as I'm aware typically do not.

Q. So mechanics that did this work in the '60s, the '70s, the '80s, the '90s, their only exposure to asbestos is from

what little chrysotile remains from the blow out of the brake wear debris, correct?

A. Well that's not the testimony of the plaintiffs, no.

Q. But that's what you believe, correct?

A. No. That's not what I said.

Q. You just told me that it was your understanding that you didn't have to grind brakes after the 1950s.

A. That's not what I said. I said, I'm aware that in the '50s sometimes you did have to machine them, they weren't custom made.

I didn't say after that -- first off, I didn't say that you always had to grind them in the '50s, nor did I say you never have to grind them after the 1950s.

I'm not a brake mechanic. I've done my own brake repairs. I used to do my own car service when I was in high school.

I can't say that I know all of the practices of brake repair, but it is my impression things have resolved -- evolved -- evolved over time, and that brakes in the past 20, 30 years, typically fit the assembly properly without machining.

Q. And that would have an effect, would it not, on the total dose of exposure that a mechanic had? If a mechanic ground the brakes as well as blew out asbestos, he would more likely than not have more exposure than a mechanic whose only

exposure to asbestos in his career is blowing out the wear debris that only contains .2 percent chrysotile asbestos, correct?

A. I would agree that if a mechanic grinds or sands or arc grinds a brake, that that would generate additional exposure in addition to blowing out the brake assembly with compressed air.

Q. That would be something important we would have to know in epidemiological study, when we're looking at cases versus controls, to be important to know how many of these individuals were exposed to asbestos from grinding, in addition to just blowing out wear debris, and those that just had the exposure to the .2 percent chrysotile generated from the blow out of wear debris, correct?

A. The studies that we have reviewed, the epidemiology studies and the analysis I've presented, involve people who were doing brake repairs in the '40s, '50s, '60s and '70s. They were doing whatever brake repair routinely involved in that historic details.

Q. But there's no details in any of these epidemiological studies that will tell us how many of those mechanics were doing blow out, and how many of those mechanics were doing both grinding and blow out, correct?

A. Many of those studies collected detailed exposure information with descriptions of every job and the tasks

performed.

The published versions of the papers, which are typically limited to six to nine pages, do not contain those details. But if you read the methods as we read in the Rake and Peto article, they asked in detail about exposure to brakes. They asked about the tasks people performed.

And if you go through the methods of many of the case controlled studies, they did ask specific details about how the asbestos was used and what tasks were performed with it.

Q. You would agree with me that a gasket that's in a pipe flange, is not subject to this process of forsterization (phonetic), correct?

A. To the extent I am aware of it, I would think it is not.

Q. Now, you talked about the connection between mesothelioma and asbestos exposure. You would agree that there's two main factors that affect the ability of anybody to make the attribution, and that would be latency and life expectancy. Do you agree with that?

A. I'm not sure I understand your question adequately. Could you restate it?

Q. Sure. If I'm trying to find out if a certain individual like Mr. Harris had exposure to asbestos, I find out he has mesothelioma. If he's dead, which life expectancy for somebody with mesothelioma is about 16 months. If I don't start my study in time and he's deceased, I have to rely on

secondary sources to find out if he's been exposed to asbestos. I have to talk to his wife. I have to talk to his kids. Sometimes I have to talk to his neighbors, correct?

A. Typically you talk to next of kin for a deceased subject in a case controlled study. The first next of kin would be the wife.

Q. And you would agree that there's certain instances because of the long latency, i.e., exposure that I had 30, 40 or 50 years ago is what's causing my disease now because of that lag time, it's difficult sometimes for spouses to know what their husband did in their teen years or in their 20s correct?

A. Yes. It is difficult to know, and epidemiologists go to great lengths to try to control for that problem.

When you do a case control study, if your case is dead and you have to interview a surrogate, you do the same for the control, when the control is living or dead.

So in other words, if a dead case, you interview the wife. If you have a control who is matched to that case, you interview the wife to ensure that you have comparable information for both the case and the control.

Q. And that's not always happened. For example, in the Agudo study, which is one of the studies you referred to, they only interviewed 33 percent of the cases, but they interviewed 80 percent of the controls, correct?

A. Well let's get the study out and look exactly at what they did.

Q. Never mind. I'll move on.

Let me ask you this, would you agree that just because we can't identify a history of exposure to asbestos in a particular individual, doesn't mean that that mesothelioma was not caused by exposure to asbestos?

A. Well, if you cannot identify a history of exposure to an agent, you're left speculating as to whether there was or was not exposure.

Q. Well, we can't conclude that it definitely was not due to asbestos unless we exhaust all information sources to see if in fact that individual was exposed to asbestos during his lifetime, correct?

A. I think it's fair to say that if you do a detailed interview and cannot undercover any information indicating a past exposure to asbestos, you have no evidence of exposure. You can speculate it could have been there. But the answer is, you don't have data that supports your speculation.

Q. But out of those 10 or 20 percent of cases that are reported in the literature of being idiopathic, where they don't know their cause, there are certainly individuals there that died before anybody can could get a detailed occupational history from them, correct?

A. There certainly may well be, yes.

Q. Let's talk a little bit about brake work epidemiology that you talked about.

In your meta-analysis you put auto mechanics down there by teachers, office clerical, and non-asbestos miners, correct?

A. Yes.

Q. Now would you agree with me that if an auto mechanic didn't do brake work for his career and wasn't exposed to asbestos, then they wouldn't necessarily have the same level of exposure as a teacher or an office clerical person?

A. Well, first off, auto mechanics I believe do repairs on the mechanical systems of cars. That routinely involves brakes, clutches and gaskets.

Q. But you're not here to say that all auto service involves exposure to asbestos, are you?

A. I'm not. If you replace a taillight, I would think that doesn't involve asbestos exposure. But if you're doing brakes, clutches and gaskets, you are handling -- or historically you're handling asbestos-containing parts.

Q. There's plenty of workers in the work force who are motor mechanics or auto mechanics, who did nothing with regard to brakes; the did alignments, they did muffler repairs, they did electrical repairs, the did tune ups, the did air conditioning repair, they did tire service, they did battery repair, they did oil changes, the did windshield repair, they were

transmission specialists or they did radiators, correct?
A. When you look at the epidemiology studies, they put motor vehicle mechanics together. I would agree not all motor vehicle mechanics do brakes, clutches and gaskets.
However, in my experience, I've never known a mechanic who didn't have some experience doing brakes, clutches and gaskets.
Q. How many?
A. Because at times they do them, even though later in his career a mechanic might specialize and do just transmissions or might specialize and do just fuel injectors. Most mechanics have actually done a wide range of repairs.
But I'm not an expert in what mechanics do, that's my personal experience.
Q. Out of the 5 million workers in the automotive field, how many mechanics have you actually had personal experience with?
A. I don't know, probably a dozen or so.
Q. Now, in your study, your meta-analysis, this is the one that was sponsored by Ford, Daimler-Chrysler and General Motors. In your chart, you actually looked at the 11 studies that you did the meta-analysis on to try and determine how many of those studies were they actually specific to somebody who did brakes, correct?
A. Yes, we did. And we gave the study a point if they specifically addressed brake repairs versus simply being a car

mechanic. Because a study that specifically addressed brake repairs, I think had better information that the person really was exposed to chrysotile from brakes.

Q. And out of your 11 studies, only three of them were specific to the type of activity that would generate asbestos exposure, correct?

A. No. They were all about vehicle mechanics, some of them asked and reported specifically that the brake mechanics -- that the auto mechanics did brake repair. These are studies of auto mechanics. These are people who do what auto mechanics do.

Q. But in eight of those studies, they had no idea how many of the people that they're calling motor mechanics or garage workers or automobile workers or anybody that has to do with auto servicing, actually did brake repair, correct?

A. I think that mischaracterizes those studies.

Again, what you publish in the six or seven or eight or nine pages you're allowed, does not allow you to publish detailed tables of everything you know.

You have to look at the methods to see what sorts of questions these authors asked, and many of them took detailed histories, and had very detailed information about the tasks that people did that involved asbestos. They didn't report out that people said they did brakes or gaskets or windshields or taillights or timing repairs. They said they were vehicle

mechanics.
Q. Your group of experts that are writing this report on a meta-analysis to try and find out if motor vehicle mechanics have a risk of mesothelioma, you went through all these 11 studies pretty carefully to see if you could answer the question, because it was part of your matrix here, of whether the authors disclosed any information in their studies, whether they were talking specifically about brakes, or whether they were talking generally about mechanics, correct?
A. No. That mischaracterizes what we did. We went through to determine whether the papers reported odds ratios or relative risks related to brake repair specifically. It wasn't whether the paper contained information about brakes. It's whether they actually could calculate an odds ratio specific to brake repair.
Q. And so you're saying you had information about these 11 studies, and more than three of them were specific to brake repair, they just didn't report those results; is that what you're telling us?
A. No, sir.
Q. Let's -- you told the court that the first epidemiologic study about brakes and mesothelioma was 1980, correct, McDonald? That's what you testified to, correct?
A. Yes. But that's the wrong paper you have up there.
Q. Right. Because this one's from 1970, 10 years earlier,

correct?
A. This one didn't report anything that I'm aware of regarding motor vehicle mechanics.
Q. Well, they talked about the survey they described. They wanted to get a more representative view of the problem in one of the two major chrysotile producing countries of the world. So they were looking at all fatal cases known to have occurred in Canada since 1959. When they did their evaluation, they were looking at occupations who had definite or probable exposure to asbestos, and they found that there were two that have brake lining installation, correct?
A. I don't know this paper. Could you give me a copy of it.
Q. Be happy to. I think you turn to page 96 -- sorry, to page 918, table six. Talks about the *Distribution of Occupations Classified Under Definite or Probable Exposure to Asbestos.* You see that, correct?
A. I don't think I've ever read this paper, sir. Could I take time to read it I don't know the paper I apologize.
Q. Well, let me go quickly just to the conclusion, then I'll be happy to let you read what you need to read.
A. Sir, if you're going to ask me about a paper, I would like to read it.
THE COURT: Let's go on to something else. If he hasn't read the paper, I don't think he would have an opinion about it.

BY MR. GEORGE:
Q. So if in fact Dr. McDonald reported on an increased risk in brake lining workers in 1970, that's not something that you're familiar with, correct?
A. Sir, to characterize that that paper reports something without establishing whether there's any odds ratio, is not a fair question. If we're going to ask about what the conclusions in the paper are, I would like to read it.
Q. I'll save that for the next time when you're in court when you've had an opportunity to review it.
Now there's also a paper from 1978, which I think you're familiar with, it's called *Non-occupational Exposure to Asbestos and Malignant Mesothelioma in Females* by Vianna and Polan. That's a study you have seen, correct?
A. Just a moment.
Q. If you haven't, I'll give you a copy.
May I approach?
THE COURT: Yes.
MR. GEORGE: (Handing paper writing to the witness.)
Q. This is a paper that we discussed in the *Daubert* hearing in Ohio a couple years ago.
A. Could I just take a minute to look at it?
Q. Is this a paper you've seen before?
A. To be honest, I'm trying to recall. I don't know that I have.

Q. The extent of this paper talks about the fact that there are wives of husbands who worked in brake lining repair that got mesothelioma. That's not something that you took into consideration in formulating your opinions, correct?
A. I have seen this paper. It's been a while. I have seen it. It is --
Q. So this is from the *Lancet* in 1978, correct?
A. May I just take a minute to familiarize myself with it again?
(Pause.)
THE WITNESS: Okay. Go ahead.
Q. Do you understand this was 1978, correct?
A. Yes.
Q. So this was two years before the 1980 paper that you referenced in your Direct, correct?
A. Yes.
Q. Now this paper they were investigating -- they had 52 females, and they were trying to see if, according to the paper, a study of the occupational history of 52 females with malignant mesothelioma, and certain of their relatives, was carried out to measure the risk of this disorder attributable to indirect asbestos exposure, showed that a significantly greater number of husbands and father of cases then of controls, worked in asbestos-related industries, and the relative risk was a factor of 10.

Now on page 1062, they give us a table of 15 of those 52 patients correct?
A. Yes.
Q. And they list there what the patient did, what the husband did, what the father did, and whether they resided in an area where there was some type of business that would be generating asbestos dust, correct?
A. Well, they report what they report. And the principal observation -- before you change it -- if you might, please, go back.
Q. Well --
A. Thank you.
Q. I understand that there's some heat insulation workers, but that's not what I'm asking about. I'm asking about the brake guys.
A. Well, sir, you asked me a question and then you changed the slide before I could answer. Please go back.
Q. Well, I'll ask you the specific question that I asked you.
A. No, sir.
Q. Isn't it true, respectfully --
MR. SCHACHTER: Your Honor, could the witness be permitted to respond to the question he was asked based on what was presented?
THE COURT: If you want to answer that question, you

have to let him go back and let him see it. If you don't want to answer that question, go on.

MR. GEORGE: I'm going to go on. I'm going to rephrase it.

Q. Isn't it true, specifically, that the authors listed the occupational history of the patient, the husband, and whether there was residential asbestos exposure; is that true?

A. Yes.

Q. Okay. And among the exposures, they had two patients, both with pleural mesothelioma who had a husband that was a brake lining worker, correct?

A. Yes.

Q. And they said of those 10 patients, 10 of the patients of the 15 had husbands and/or fathers who worked in asbestos-related occupations whereas their matched controls did not. This is your case controlled study, correct?

A. It is a case controlled study, that is correct.

Q. And they said all of these 10 patients routinely hand laundered their husbands or father's clothing, correct?

A. Yes.

Q. And they said the estimated relative risk of mesothelioma for this pattern of exposure, which is laundering the clothing of husbands and fathers, some of which were brake lining workers, gave relative a risk of 10, with a 95 percent confidence interval of 1.42 to 37.40. That would be a

significant, statistically significant increased risk of mesothelioma, correct?

A. That is a significant association, but it is important to look at what they're actually analyzing. They're analyzing the occupations of the husbands, all of which were presented in that first table that you took down quickly.

And there -- the risks are more likely to be related to the husband having worked in insulation, which some of them did, and with electrical wire insulation as electricians or elevator insulation, all of which is in that table.

So what you've characterized as a 10-fold risk, relates to the comparison of all of the cases whose husbands were -- many of whom worked in settings where there was likely to be thermal insulation.

Those authors presented no analysis that showed any relationship between husbands working with brake linings and risk of mesothelioma. There is none.

I would also point out that that paper says nothing about having been a brake mechanic. You cannot tell from this paper whether these people worked in brake product manufacturing, or whether they were auto mechanics, because the paper doesn't say.

The important point is, there is no measure of association in this paper that says anything about risk of mesothelioma related to brake linings.

Q. And what the authors didn't do is have the interpretation that you're trying to foster right now. They didn't say, this relative risk applies to eight of the 10 patients, but not to the two whose husbands only had brake lining repairs, correct? They didn't say that in the paper?

A. Sir, it says exactly -- if you'll please hold back on the quote you were asking me about until I get the answer.

It reports the relative risk of mesothelioma for that pattern of exposure, putting all of the cases and controls together. That is not the relative risk for brake lining work. That's the relative risk for all of the data.

And what you have actually just pointed out is a very good example of confounding.

Q. Twenty percent --

A. Okay. So what we have is an association between asbestos exposure, much of which involved thermal insulation, and risk of mesothelioma, where you're trying to say it's attributable to brake lining without controlling for the other exposure.

Q. Now we have cases in here where the plaintiff was a textile worker. There's one, two, three, four of them are textile workers. Those are not insulation exposures. Those are insulation exposures to chrysotile asbestos, correct?

A. Sir, you brought this up as an example of a case where women whose husbands worked with asbestos were at risk of mesothelioma. The point of the paper is the husband's

occupational history.

And please stop moving the slides ahead before I can answer your question.

Can we go back to the table, sir?

Q. (Indicating.)

A. Thank you. The husbands worked as pipefitters, heat insulation workers, heat electric wire worker, heat insulation worker, heat insulation worker, elevator insulation worker, electric wire insulation worker. Okay. That's the point of the paper. All of that is grouped together.

Q. Twenty percent of that exposure, two out of the 10 there that had husbands that they were referring to had brake lining exposure, correct?

A. Well, I think if you'll go back to the paper, you'll actually see that it's three, not two. And if you tried to calculate an odds ratio where you have three cases, of course they haven't told us how many of the controls had husbands who worked as brake lining workers, it is unlikely you would achieve statistical significance from such a small number. But you can't do the calculation because the authors don't present the data.

Q. Now you did present the case of Eva Hansen. She did a study, she did a 10-year follow-up on the mortality of auto mechanics in Scandinavia, correct?

A. Yes.

Q. And for specific cancer sites, she saw increases for pleural mesothelioma. That's what she reported, correct?
A. Could you show me the paper, please?
Q. This was a paper on your chart, not the first time you have seen this?
A. I have seen this paper.
Q. In fact, you cited it in your direct.
MR. GEORGE: May I approach?
THE COURT: Yes.
THE WITNESS: Thank you.
BY MR. GEORGE:
Q. Isn't it true in the final incidence of the abstract, they said increases were seen for pleural mesothelioma, correct, among other cancers?
A. That is what the abstract says. But she did not calculate any measure of association.
Q. She said that the asbestos exposure known to occur during replacement of brake linings, and the single case of pleural mesothelioma is an indication that this exposure has not been negligible. That's what she wrote, correct?
A. That's what she wrote. Although there is good reason to think that that's not a valid conclusion.
Q. Now we go to table one on page 44. This gives us some of the age demographics of the exposed persons that she was evaluating, correct?

A. Yes.
Q. And if we look at this chart, you would agree with me that the average latency period for somebody exposed to asbestos is about 35 years?
A. Yes, or slightly longer.
Q. If we look at the people that she was looking at, 92 percent of them were 50 years old or younger after the 10-year follow-up?
A. How are you getting that?
Q. Well, if we look at how many were between 15 and 24 when she started in 1970 at 64 percent. Between 25 and 34 were 21 percent. Between 35 and 44 were 7 percent.
A. Again, sir, your question said 50 or younger.
Q. 54 years old or older after the 10 years?
A. Sir.
Q. Ninety-two percent of this cohort was under the age of 54, 10 years after they started when they did this evaluation. Is that what that chart shows us?
A. Sir, your previous question said 50. This gentleman's head was blocking the footnote. And I was looking and thinking, how is he getting 50? The table doesn't report 50. Your question was wrong. You have to wait until I answer, please.
Okay. Yes, this was a young cohort.
Q. And so if we went back and visited this cohort where

maybe more than 8 percent of them were in the age where we would expect to see mesotheliomas, we might see more mesothelioma cases than that single one, correct?

A. Well, as this cohort ages, and as the comparison population ages, you would expect both groups to have incident cases of mesothelioma.

Now, before we go on from Hansen, sir --

Q. I have no more questions about Hansen, respectfully.

Let me just talk to you about -- in your meta-analysis, your co-authors on that were scientists from Exponent, correct, some of them?

A. Yes.

Q. And Exponent is a large organization that provides litigation support for businesses. There are a lots of Ph.Ds and other qualified experts, correct?

A. I don't know no Exponent's business. I do have some colleagues that work at Exponent.

Q. Do you know Mike Kelch or Valerie Craven?

A. I met Dr. Kelch when he was getting his doctorate in epidemiology at UCLA in the 1980s. Yes, I know Dr. Kelch. I know he was at Exponent for years. He is no longer at Exponent. I think he now works at Amgin (phonetic).

Q. They were co-authors with you on your meta-analysis, correct?

A. Yes.

Q. And you're aware that they took your paper -- you're aware that in the early 2000s the EPA decided that they were going to re-evaluate a brochure that they put out entitled, *Preventing Asbestos Exposure Among Brake Clutch Repair Workers.* You're aware of that, correct?

A. Sir, what document is this that we're reading from?

MR. SCHACHTER: Objection, Your Honor. We're going well afield --

MR. GEORGE: This is a letter --

MR. SCHACHTER: May I raise my objection?

THE COURT: Yes.

MR. SCHACHTER: He's getting into regulatory issues of something presented to the EPA. It's well beyond the direct examination in an area where this witness has not been tendered.

THE COURT: Well, we'll let him inquire. Go ahead.

BY MR. GEORGE:

Q. Were you aware that Valerie Craven and Michael Kelch, your co-authors took your meta-analysis and sent it to the EPA for input on whether the EPA should report those results to the population in their EPA booklet. Are you aware of that?

A. No.

Q. Okay. Now you are aware -- have you seen the actual booklet that came out by the EPA? Have you seen, *Preventing Asbestos Exposure Among Brake and Clutch Repair Workers?*

MR. SCHACHTER: And once again, Your Honor, we have to object. Regulatory activity as we briefed to the court, regulatory materials are not supportive of causation. They're not included even in this district with the opinions that regulatory activity are not relevant to causation. We didn't go into regulatory acts with this witness.

THE COURT: We'll let him inquire. Go ahead.

BY MR. GEORGE:

Q. Are you familiar with this document?

A. I don't know it with that picture on it, I'm not sure.

Q. Okay.

A. I know I have seen something from the EPA about preventing asbestos exposure among brake and clutch repair workers, but I don't recognize the document that you put up.

Q. You're not aware of any governmental agency adopting the results of your meta-analysis and informing the public that they could rest assured that their exposure to brakes does not cause mesothelioma, correct?

A. I have not followed what all government agencies are doing, and I didn't prepare on that topic for my testimony in this case.

Q. You are aware that there are other scientists out there who disagree with your conclusion, based on review of the same epidemiologic studies that you reviewed, correct?

A. I don't believe that's correct. If you're referring to

Dr. Egilman's paper, I don't think he has reviewed the same studies I just presented.

MR. SCHACHTER: Your Honor, I have to object to the -- first of all the length of the cross examination going into articles we didn't go into. And to presenting articles without the witness having first testified whether it's reliable or not under the rules of evidence that's a prerequisite to even mentioning these articles.

THE COURT: We'll let him roll for a bit forward. Let's wind it up here pretty quick.

MR. GEORGE: I'm working through it.

Q. You're aware of Dr. Egilman, correct?

A. Yes.

Q. He has the same degree that you have, because he went to the same institution that you went to and got his Master's of public health, correct?

A. I believe Dr. Egilman got his MPH at Harvard, yes.

Q. And his conclusion, in fact, he titled his article, *Abuse of Epidemiology Automobile Manufacturers Manufacture a Defense to Asbestos Liability.* You've read this before, correct?

A. Yes, I have.

Q. And he goes into a very detailed discussion about why he doesn't believe that anybody can reach the conclusions that you've reached from reading the same type of literature, correct?

A. Many of Dr. Egilman's opinions are wrong. They're demonstrably wrong. Let's go through them.
Q. I just asked you one simple question. Does he disagree with you?
A. And I gave you a simple answer. Much of what he says is wrong, and I can show you it's wrong. Let's go through it.
Q. And when you go to trial, the 15 times that you've gone to trial and you've taken the stand and you've given the presentation that you did on direct, somebody like me comes in and cross examines you and gives the position of other people who disagree with yours, correct? It's a debate in the legal context?
A. To the best of my recollection I've only been asked about Dr. Egilman's opinion piece once on the stand, and I never heard about it again. Because you can show that Dr. Egilman's points are poorly informed and wrong.
Q. Now you're familiar with a paper entitled, *Asbestos Exposure Causes Mesothelioma But Not This Asbestos Exposure,* an Amicus Brief to the Michigan Supreme Court by Laura Welch?
A. I am familiar with that, yes.
Q. And you recognize that she was joined by 51 other signatories on her paper, correct?
A. I am aware that a number of other people signed that paper.
Q. And among those signatories were people that are

epidemiologists just like yourself, correct?
A. Yes.
Q. Some of them are Ph.D epidemiologists unlike yourself, correct?
A. We'd have to go through them. I think some of them have Ph.Ds in epidemiology.
Q. And their very purpose of this paper is to say that there is a debate whether exposure to brakes can cause mesothelioma; isn't that true?
A. Well, I think that's one of the purposes of the paper. There is a debate. And when you look at the scientific evidence, there is not support for there being risk -- increased risk of mesothelioma related to brakes.
Q. I'll only make one point with this paper.

They say in their abstract, this article outlines the evidence supporting the conclusion that asbestos from brakes can and does cause mesothelioma and describes the defendant's attempts to fabricate doubt about this conclusion. That's what they wrote, correct?
A. Well, you've read it correctly. I strongly disagree with the assertion that presenting contrary evidence is an attempt to fabricate doubt. Scientific inquiry is about data and evidence and scientific methods.

If the people who disagree with you are characterized as fabricating doubt, I think that is contrary to the practice of

science and the goals of science to not entertain that they actually have data and evidence that is on their side.

I would also point out that Dr. Welch's paper failed to consider most of the positive evidence. She doesn't cite the papers I cited. It's not clear that she has read them or given them any fair consideration.

I think it would be fair to say that her paper is a biased representation that selectively finds only the positive evidence and ignores all contrary evidence. Methods like that are not reliable scientific methods, and you cannot draw reliable inferences when you are unwilling to consider the data that doesn't go your way.

Q. And yet 52 of her colleagues, 51 of her colleagues, many of them Ph.Ds in epidemiology, agree with the statement that there is evidence to support the conclusion that asbestos from brakes can and does cause mesothelioma, correct?

A. It's difficult to understand how those people could have signed that without having read all of the evidence carefully.

Q. Now, you did show that there is some recent evidence that supports that proposition which was the analysis of the Massachusetts Cancer Registry, where they found that there was in fact a risk of 2.1, with a 95 percent confidence interval of 1.1 to 4. That would be a significantly increased -- statistically significant increased risk of mesothelioma from that occupation, correct?

A. As I covered in my earlier slides, yes.
Q. Now I wanted very briefly -- you put this slide up where you did a lung burden analysis for all the various trades to see where their amphibole asbestos -- what the counts were, correct?
A. That doesn't characterize that accurately, but I've described this slide previously.
Q. And you talk about amphibole fibers. You were aware that chrysotile asbestos, because of its characteristics, tends to migrate to the pleura where mesotheliomas occur, correct?
A. I can't say that I'm an expert on the migration of chrysotile versus amphiboles through the lungs.
Q. Are you an expert on how easy it is to detect chrysotile in lung tissue?
A. I am not an expert in lung burden analysis.
Q. Okay. So your analysis here doesn't include what affect the exposure to chrysotile would have on these populations, correct?
A. Oh, of course we looked at that.
Q. Well, by lung fiber burden analysis?
A. By lung fiber burden analysis. Yes of course we looked at that. There was no significant association between the lung fiber -- the lung chrysotile fiber content, and the relative risk of mesothelioma. We looked at it.
Q. Where is that chart?

A. It's not in there, but we did a multivariate regression that put in both the amphibole fibers and the chrysotile fibers. And once you adjust for the amphiboles, chrysotiles have no significant effect.

Q. You would agree with me that there are people in this chart, specifically shipyard workers, plumbers and pipefitters, boilermakers and machinists that all have exposure to gaskets?

A. I believe a number of these occupations would come into contact with gaskets, yes.

MR. GEORGE: Your Honor, I have two issues that I wanted to cover just briefly that deal with his report. Since his report is in evidence on the *Daubert*, I think this are two --

THE COURT: Go ahead.

MR. GEORGE: Okay.

Q. In your paper, in your report, you talked about Balangero, Italy. You say that a series of studies that reported on the mortality experience of miners in Balangero mine near Turin, Italy. They started in 1960, ceased in 1990. They had a work force of 30 -- 300 to 350 men.

One of the importance of the exposures of those individuals was represented in a paper by Mirabelli and others entitled, *Excess of Mesotheliomas After Exposure to Chrysotile in* Balangero*, Italy.* Are you familiar with that paper?

A. Yes.
Q. And what they found is, this is a chrysotile comes from a mine in Italy that's considered to be free of tremolite. In a cohort study of miners and millers, only two pleural cancers were reported. A finding considered to indicate chrysotile has a low potency of inducing mesothelioma.

However, they then did a follow-up which ended in 1987 where they didn't look at the workers -- white collar workers or the subcontractors, these authors did, and what they found is four new cases of pleural mesothelioma among the blue collar workers in the mine, in addition to two that were reported in the previous study. Six mesotheliomas compared to the 1.5 expected.

The study also identified three mesothelioma cases among white collar employees at the mine, five in workers in the mine hired by subcontracting firms. And three among workers processing Balangero chrysotile outside the mine.

Then they found 10 more cases due to non-occupational exposure -- where exposure to reused mine tailings were identified.

So they found a total of 27 individuals exposed to this type of chrysotile who developed mesothelioma, correct?
A. Yes. And what they didn't say is that other investigators who have looked at the ore and found that the tailings were 10 percent tremolite. So when they say that

it's tremolite free, that conflicts with other investigators who have reported the tailings had very high concentrations of tremolite.

Q. And we're going to get to that.

Conclusions. The cluster of 14 mesothelioma cases among workers who were active in the mine, and 13 among people exposed to Balangero chrysotile, provides further evidence that tremolite-free chrysotile is carcinogenic. That was their conclusion, correct?

A. That is what they said, but it is difficult to reconcile that with the evidence that the tailings were very high in tremolite.

Q. Well they say the authors who studied this mine say that the chrysotile from this mine is tremolite free, and contains trace amounts of a substance called balangeroite, a non-asbestos fibrous mineral similar in shape to amphiboles. That's what they reported, correct?

A. These authors say tremolite free, other authors say 10 percent tremolite in the tailings.

Q. They say that the asbestos and the mine tailings --

A. Sir, I hadn't finished, if I might.

Q. Well you made this point twice, and I'm going to get to the study --

THE COURT: Let him finish.

THE WITNESS: I was speaking, sir.

You've raised another very important point which is the balangeroite. That is a fibrous mineral that is similar to amphiboles. In early reports it was felt to have toxicity similar to crocidolite. It is a contaminant in the chrysotile concentration ranges between .5 and 2 percent. Later reports suggest that it may not be as toxic as crocidolite.

So the issue at Balangero is the following, there's substantial evidence the tailings were contaminated with tremolite, and there is the existence of another fibrous mineral that is worrisome with respect to its toxicity that may relate to mesothelioma.

Q. Now when they looked at the tailings, which were crushed serpentine rocks left over after fiber extraction, they only found up to 1 percent chrysotile fibers by weight, correct? That's what those authors reported.

A. And they didn't comment on the tremolite content of tailings.

Q. Well they did comment by saying it was tremolite free?

A. They said the ore was tremolite free, they didn't mention the tailings. The tailings, in some authors' observations were 10 percent tremolite.

Q. They said the hypotheses had been advanced, that chrysotile itself would not induce malignant mesotheliomas and that there are occurrences in Quebec miners and millers could be due contamination by fibrous tremolite. The occurrence of

mesothelioma in individuals with exposure to Balangero chrysotile, is important, because no tremolite has been detected in it. That's what those authors reported, correct?
A. Yes, sir. And I have reported -- or I've pointed out now a number of times now, other authors say the tailings had 10 percent tremolite.
Q. They go on to say that balangeroite has never been tested for carcinogenicity in long term animal experiments. Therefore in light of current knowledge, it cannot be considered a carcinogen, nor can it be implied to cause mesotheliomas instead of chrysotile. That's what their authors said, correct?
A. Well, I think they had slightly different conclusions in a different paper. I would agree that the carcinogenicity of balangeroite has not been characterized. And it is not clear whether it does or does not cause mesothelioma.
Q. I apologize for turning back. I'm trying to grab something.
Would you agree with me that you did not cite this paper in your report?
A. Could you go back to the title of it, please?
Would you give me a copy of it then, please.
MR. GEORGE: Sorry. May I approach, Your Honor?
THE COURT: Yes.
MR. GEORGE: Now that I'm almost there. (Handing

witness paper.)

THE WITNESS: Thank you. All right. This paper, if you go back to the abstract, makes it clear.

This basically reports the results could we --

BY MR. GEORGE:

Q. My question is simple. In your report, did you cite this paper? I have you citing Rubino, Piolatto, Silvestri, Pira, Rubino. I do not see a cite for Mirabelli; is that correct?

A. Mr. Smith George, if you ask me a question about a paper and then take it down and then move on before I answer it, sir, I can't answer it sir. I would like to answer.

Q. My only pending question is, is it in your report? That's the pending question.

MR. SCHACHTER: To save time, Your Honor, may I show him the bibliography to the report that contains the citation to this paper?

MR. GEORGE: I'm not talking about the bibliography. I'm talking about the discussion of balangeroite in Italy that's in your report. Is that contained in your discussion of Italy's balangeroite?

A. It's cited in my bibliography because it is discussed in my report. Do you want to find it?

Q. It's certainly not discussed in the part of your report that talks about Balangero, Italy, correct?

A. Let's find it.
Q. We'll save that.
A. Reference 156. If I might try to answer your question before you move on.

This is about the mesothelioma registry, okay. If you could go back and show the methods and make it a little larger. It's not about -- it's not limited to the workers in the mine. It's -- it's about a registry study where they are simply tallying up cases. They don't have any measures of association in this paper. All they're saying is, we have found mesotheliomas in the region of this mine.

Okay. You don't have a measure of association. You don't have a test of statistical significance. What you have is a tabulation of cases, some of which came from the miners. Some of which who came from the people who worked with the tailings. Some of which who worked in the region in other industries.

Q. Okay. Now with regard to balangeroite, you're aware that Turci and others have investigated the ability of this trace contaminant in the Balangero chrysotile to cause mesothelioma. You're seen this article before, correct?
A. I'm aware of this article and its predecessor to it that complained the in vitro cited toxicity of balangeroite was similar to crocidolite.
Q. What these authors found at a later point in time, is

that considering the profound differences between the structure of balangeroite and amphiboles, previous results and observations on poor ecopersistence of balangeroite and the present data, we conclude that the balangeroite traces may contribute to the overall toxicity of the airborne fibers in balangeroite, but may not compare to tremolite -- be compared to tremolite, nor considered the sole responsible for the excess of mesothelioma found in balangeroite.

So they're saying, unlike Canada where there's a plausible explanation that may be the tremolite is contributing to the mesothelioma deaths in the Canadian chrysotile workers. In the Italian chrysotile workers, we can't say that Balangero (sic.) is solely responsible for the excess mesotheliomas, correct? That's what they're saying?

A. I think that's what they're saying. It says, we don't think it's solely responsible. But I think that what is in there is an admission that it may be responsible in part and they don't know.

Q. And what they say is, balangeroite has a crystal structure different from amphiboles, exhibits an ecopersistence and a durability in body fluids of the same order of magnitude of chrysotile, and was supposed to be never detected in exposed workers. Under such circumstances, it may slightly contribute to the overall toxicity, but cannot be considered responsible for the excess of mesothelioma found in

Balangero in past and more recent studies.

That's what they found, correct?

A. That is what they said. But if you can please just hold for a minute before you move on. And I believe what they're saying is, we don't think you can attribute all of the excess of mesotheliomas to balangeroite. It might be in part due to balangeroite, it might be in part due to the chrysotile.

I think a fairer answer would be, the carcinogenicity of balangeroite has not been characterized fully, we simply don't know.

Q. This -- you said that there was no statistical association between the exposure of balangeroite and mesothelioma in the Mirabelli paper, correct?

A. No. That is not what I said.

Q. You -- you're familiar with Piolatto?

A. Piolatto.

Q. Piolatto. That was an update that they did on the same miners in 1990, correct, cited in your paper?

A. I'm actually looking for it. You'll have to forgive me. It takes me a moment. Anyhow, I have read the paper.

Q. And you're aware that they examined several samples of chrysotile from the mine, and ruled out the presence of contamination with fibrous amphiboles at detectable concentrations. In other words, they didn't find any tremolite, correct?

A. Well, sir, you're belaboring a point about the ore, where I keep talking about the tailings. Now that's an important distinction, because -- and I'm not a miner. I don't claim to be an expert in mining. But the point is, when you mine, there's a lot of stuff that has no economic value. That's called tailings, and you throw it away. So while the ore may not have tremolite in it, the tailings did.

If you're a miner, you're mining both. And if you're exposed to the waste from the mine -- if someone is giving away the tailings to be used in road construction or for other uses, you may have exposure to tailings but not the ore.

So you keep putting up that the ore doesn't have tremolite, I keep saying that the tailings appear to.

Q. And the sole basis for you to say that the tailings have tremolite in it is this study by Mickey Gunter, Elena Belluso and Annibale Mottana entitled, *Amphiboles: Environmental Health Concerns*, 2007 correct?

A. Yes.

Q. And this is a easily more than a 50-page book chapter, correct?

A. I believe so.

Q. And the only reference in the entire chapter that they have to balangeroite says, "the now closed mine is still surrounded by over 65 million cubic meters of waste hosting an estimated 800,000 cubic meters of fibers, most of which are

short fiber chrysotile. But there is an estimated 10 percent tremolite in the tailings."

There is no citation to where they got that information from, is there?

A. I do not see a citation.

Q. We don't know where this area is, and we don't know where those tailings came from, do we? They don't tell us. They just say there's a mound of stuff, 10 percent of which may have tremolite in it?

A. Well it says the mine is surrounded by waste, 65 million cubic meters that is 10 percent tremolite. I think it is a reasonable presumption that the waste surrounding the mine came from the mine.

Q. That's a presumption you're making. There is no objective evidence that those tailings came out of the mine, or whether they came from some other area and were dumped there. There is nothing that those authors cite to where we can find where the location of this is and how they came up with their estimate of 10 percent, correct?

A. I do not know where they got their data regarding the tremolite in the tailings. They don't say. It does raise a reasonable concern that there was a lot of tremolite in the minerals coming out of that mine.

MR. GEORGE: This is a good time to break for lunch, if you would like, Your Honor.

THE COURT: I would like to get him off the witness stand.

MR. GEORGE: Okay.

Q. One last area that I wanted to talk about really quick is the Marshville plant in North Carolina.

Now the reason why this plant is important is because -- and you're familiar with the Loomis/Dement paper, *Lung Cancer Mortality in Fiber Exposures Among North Carolina Asbestos Textile Workers,* correct?

A. Yes, sir.

Q. This study provides further evidence that exposure to chrysotile asbestos in textile manufacturing is associated with an increased risk of lung cancer, asbestosis, cancer of the pleura and mesothelioma, correct?

A. That's what it says.

Q. And what they base it on is the fact that three workers with deaths coded to pleural cancer had been employed in plant three. Now they did use amosite in plant three, but it was in an area where none of those worked, correct?

A. I'm not sure why we're even talking about plant three, but that's what it says.

Q. Well, because the only exposure that those three workers had was to chrysotile asbestos, because they didn't work in the area where the amosite was, according to the authors?

A. I don't believe that that's a fair conclusion. So your

comment is that if they didn't work in the insulation areas, they didn't have exposure to amosite?

Q. Well that's what the authors say. The three workers with deaths coded to pleural cancer, have been employed at plant three where some processing of amosite is known to have occurred, but none of them had worked in the insulation areas.

A. Well, I think these authors did not conclude that plant three was a pure chrysotile plant. They admitted that this was a mixed exposure plant.

Q. Right. And they did the processing in a part of the plant where the three people with mesothelioma didn't work.

A. Well, do you want to hand me a copy of the paper?

Q. Let's move on to Marshville just so I can get you off the stand.

The remainder, including all four workers whose deaths were coded to mesothelioma, had worked at plant four, where there's no record of amphibole asbestos having been used. That's what John Dement wrote, correct?

A. That's what they wrote and it is clearly wrong now.

Q. Now that may be underreported, because mesothelioma is believed to have been underreported in early years of the study, so it's possible that they missed some cases, correct? That's what they report?

A. Well, that's what they said, yes.

Q. Now you say that Dr. Dement is wrong, because there's

records that exist showing that there was amosite in plant four which we know is the Marshville plant, correct?
A. That's correct.
Q. Now, you got documents -- and I assume the documents actually came through your counsel, correct?
A. Yes.
Q. And in fact, they asked the Manville trust, which Johns-Manville brought the plant from UNARCO in 1963, correct?
A. I believe so.
Q. They asked the Manville trust, do you have any documents about this Marshville plant. And they provided literally, 3,000 -- almost 4,000 pages of documents about the Marshville facility, and another 3,000 pages of deposition testimony, correct?
A. I don't actually know what you're talking about. I have not seen 7,000 pages of documents from that plant.
Q. These three affidavits are in your report, correct?
MR. SCHACHTER: To speed it up, it's in the appendix.
Do you mind Your Honor?
THE COURT: No. Go ahead.
THE WITNESS: Yes. The affidavits are attached in appendix to my report, yes.
BY MR. GEORGE:
Q. So from your comments I gathered you weren't the one who

looked at these 7,000 pages of documents to see if there was any evidence of amphibole, that was done by your counsel, correct?

A. I did not look through 7,000 pages of documents regarding the Marshville plant.

Q. So your counsel found some documents which they gave to you. One of which is some answers to interrogatories. They're also attached to your report. And they talk about the fact that asbestos textiles were manufactured from chrysotile asbestos fiber and cotton, twisted into yarn, and then woven to cloth, tape, tubings, sleeves, and cords, and they were manufactured at Marshville, correct, according to these interrogatories?

A. Those materials using chrysotile among others, yes.

Q. Braided asbestos packings, yarns treated -- braided into squares, twisted or plain treated with neoprene or other coatings were made at Marshville, correct?

A. Yes. And we know some of the products contained amosite.

Q. Those are the only two entries in those UNARCO interrogatories that mentioned what Marshville produced, correct?

A. I'm not sure what you're referring to in those Marshville interrogatories. There's quite a bit of evidence about what Marshville produced.

Q. In the UNARCO interrogatories which are a part of your

report, the only two entries in interrogatories sweared to by UNARCO is these products were manufactured at Marshville, correct?

A. I don't even know how to answer that. There are other documents in my report, such as the deposition testimony of John Aldridge that make clear that amosite products were also manufactured at Marshville.

Q. And we'll get to Aldridge. I'm taking only about the UNARCO interrogatories. They list tons of products. The only ones they said were made specifically at Marshville, were asbestos textiles manufactured from chrysotile and braided into asbestos packing, corrects?

A. Just a moment. Okay. There are exhibits to the interrogatories --

Q. Yes.

A. -- that mention the basic raw materials used in the company's asbestos products where chrysotile and amosite asbestos. And so I think the interrogatories with the appendices establish that both chrysotile and amosite were used.

Q. That's not my question. My question is this, the only portion of UNARCO's answers to interrogatories where they say this is what was made at Marshville, was asbestos textiles and braided packings, correct?

A. Sir, I'm not a lawyer, and I don't understand the

question. When there is an appendix or an exhibit attached to a interrogatory, why I should ignore that. You'll have to --
Q. Well let's go further. The cloth, you would agree, is made out of chrysotile. Because they say so. Description, woven from asbestos yarn. Yarns are made from long fiber chrysotile asbestos, through a process where they make non-twisted strands called rovings, and then they spin them to produce yarn, and then the yarn is turned into cloth. That's what they report in their interrogatories, correct?
A. That is one line of products from the Marshville plant.
Q. Now in the UNARCO textile product book, they talk about yarn, tape, tubing and cloth. And all of those products, yarn, tape, tubing and cloth, are all chrysotile-containing products? Would you agree with me that there's no indication that the yarn, tape, tubing or cloth contained any amphibole asbestos?

MR. SCHACHTER: Your Honor, if I may. This is really wasting time. His own expert has admitted that the Marshville documents demonstrate the use of amphiboles at the Marshville plant, and that the John Dement study should not have been published with that statement in it. He's going to get on the stand and admit that so we're wasting valuable time here going over something that can't really be seriously disputed?

THE COURT: Let's see if we can wind it up.

Is there a question pending?
BY MR. GEORGE:
Q. I'm just asking, is there any amphiboles in those products?
A. It is difficult for me to answer exactly the way you structured your question.
Q. Now this is not the first time you've seen this catalog because this is part of your report, correct?
A. I know, sir. But there are other documents that provide additional information that is not in the catalog. And I'm trying to answer carefully.
Q. I'll move on. I'll move on. We did spend four hours about this in your deposition, correct?
A. Now, for example, okay. We know that the Insubestos felt that was made at Marshville, was woven from amosite. This is the same felt that meets the military specs that Captain Wasson was talking about yesterday. It was made in Marshville. We know that from Section Four of my Marshville documents. And we know it was made in Marshville from the testimony of John Aldridge, which is Section Three.
So while I don't see it in the answers to interrogatories or the product catalog, it's quite clear that this is an amosite textile product that was made at Marshville, made with amosite, and met Navy specifications for use on naval ships.
Q. Your sole basis for that statement is the testimony of

John Aldridge, correct?

Out of the 7,000 pages of documents that you didn't review, that your counsel reviewed, the only thing they ever gave you that showed that Insubestos felt was manufactured in Marshville, is the testimony of John Aldridge, correct?

A. Yes.

Q. Okay. Now let's explore this real quick. John Aldridge was hired in 1954 and he was employed in Bloomington, right? That's in Indiana. He wasn't employed in Marshville?

A. That is correct. He had duties to travel to Marshville and inspect it periodically, I think, a couple times a year or more over a period of years.

Q. In 1958 or '59 he was given assignment to go to the three UNARCO plants, Marshville, Tyler, Texas and Bloomington to do air samples, correct?

A. I believe that's correct.

Q. And he did it.

He was asked, what products are produced at the Marshville plant at that time?

He said, asbestos textiles.

Was there more than one type of textile being produced?

Oh I'm sure there was.

Do you remember?

And he shook his head, no.

Do you remember?

No. He didn't remember what types of products were manufactured at Marshville, according to this testimony, correct?

A. At page 115 he remembered Insubestos.

Q. At this point he doesn't remember, correct? Is that what the testimony says?

A. At this point in response to that question, that was his answer.

Q. Then at the end of the deposition they asked him, are you familiar with a product line known as insabestos (phonetic).

He said, yes.

Could you tell me what it is?

He said it was a thick asbestos felt.

Where was it manufactured.

He said, I believe the start of the process was in Marshville, and I believe the finish of the product was Bloomington.

Now you don't know what the "start of the process means", do you?

A. Well, I believe that Marshville was a textile plant. They made thread and rovings, and wove things. And Insubestos was made from an asbestos -- I don't know my terminology for textiles well -- rovings, I believe, that were on brass wire and it was made into a felt to the military specifications.

Q. Bottom line is, you don't know what it means to "start

the process in Marshville", correct?
A. I do not know specifically what it means "to start the process in Marshville".
Q. And your counsel didn't provide you with UNARCO's answers to interrogatories from Utah, did they -- I mean from Colorado?
A. I don't recall them in the way you described them. Could I see them?
Q. Sure. (Handing paper writing to witness.)
A. Thank you.
Q. These are interrogatories just like the ones you relied on, correct?
A. Well, I haven't had time to read them. They are responses to interrogatories.
Q. If you go to the third -- fourth to the last page, they actually give us information about what was made at the various plants.
A. Yes.
Q. And they tell us -- switch -- that was made in Marshville, kind of the same thing that was made in Davidson, which was cloths, tapes, tubings, yarns, et cetera. The Insubestos felt on the other hand was made in Bloomington.
They said, these products in the plant in Bloomington, unibestos pipe insulation, unibestos insulating blocks, Wovenstone, Insutape, Insutube, Insubestos,

were all made in Bloomington. That makes sense because all those products have amosite in them, correct?
A. Well, that makes sense, but it also makes sense that it was done in Marshville, because we have documents that I've put in my appendix that show certain looms were weaving amosite. And that amosite products were being shipped in tonnage quantities from Marshville.
Q. First of all, out of that 7,000 pages of documents, you haven't seen a single purchase order going to Marshville from a company that sold them amosite fiber, correct?
A. I have not seen such a document.
Q. And the document that you're referring to about proving that amosite was used, is this document? First of all, you have no idea what that document is, do you?
A. Well, let's -- let me at least get to the full document rather than just --
Q. That is the whole document.
A. Well, let me at least open my copy. Can I see the Bates number at the bottom?
Q. 002887. This was the document that you were referring to, correct?
A. Yeah. I'm on the same page, yeah.
Q. That was the document you are referring to, correct?
A. Yes.
Q. Now all we know is it's loom something. Because we can't

even read what the loom number is. We know they did a bunch of styles of stuff, but we have no idea what those styles are, correct?

A. Some of those you can actually correlate back to the product manual.

Q. Have you done that?

A. Some of them I did try to cross reference them back, yes. And you can clearly --

Q. They're all chrysotile --

A. You can clearly identify Wovenstone cloth. And you can see the headings are blocked out, but it says through 40 inches and something else says 50 inches. So you have the dimensions. You can see the max width is 60 inches. The actual min width is 30 inches. So they're weaving various textile products on a loom that can handle 30 inches to 60 inches, and they have specifications for the different products.

Q. What this document doesn't tell us, how much did they manufacture; when did they manufacture it; where did they manufacture it; what was the result of the manufacturing; and what was contained within the woven stone cloth? That document doesn't answer any of those questions, correct?

A. This document alone does not answer the questions.

MR. GEORGE: I'm almost done.

Q. I'm skipping through. The last point I want to raise is,

you are aware that Dr. Dement actually had dust measurements from the Marshville plant, correct?
A. Which paper is this?
Q. This is, increased lung cancer mortality among chrysotile asbestos textile workers is more strongly associated with exposure to long thin fibres.
A. I was just trying to see which journal was it published in, sir.
Q. It's from the Occupational Environmental Medicine, 2012.
A. May I see a copy?
MR. GEORGE: Your Honor, may I approach?
THE COURT: Yes, sir.
THE WITNESS: Thank you.
BY MR. GEORGE:
Q. You are aware of the document, are you not?
A. I think I have seen this in the past, yes.
Q. And what this document -- what they did in making their assumption that most of the exposure if not all of it was to chrysotile, is they had 160 historical dust samples that were captured on membrane filters that were collected in surveys of the study of the plants, 1964 through 1971, correct?
A. Well, that's the first sentence. If you read the next sentence if you would, please. It says the TEM fiber counting protocol was based on the ISO direct transfer method. And procedures for combining the data by plant and operation, and

deriving size specific exposure estimates followed the procedure described by Dement, et al.

To the extent I'm aware of it, they could not differentiate between amphiboles and chrysotile with those methods.

Q. Well, don't they say on page 567 that contamination with amphibole fibers is also unlikely to confound the results. Fibers were identified by morphology. And morphology means these physical characteristics of the fiber, length, width, et cetera, correct?

A. Well, what they've done now is they've gone to an electron diffraction technique. So my previous comment was correct, the TEM doesn't tell you the fiber type. Now they have gone to electron diffraction, and they have counted 38,940 fibers, and they have found amphiboles, but it's a small proportion --

Q. Sixteen --

A. What they're not telling, at least as far as I am aware, is whether these fibers are representative of all 160 historic dust samples. And what they're not telling is whether the 160 historic dust samples are representative of the range of exposures in the plant.

So while they did find amphiboles, what you cannot say from what they've written here, is whether that is a fair characterization of the use of amphiboles in that plant in

different areas at different times.
Q. So they had 38,940 fibers. They looked at all of them under selected area diffraction which tells us what's the chemical composition of that fiber so we know whether it's chrysotile or whether it's an amphibole, correct? That's what the process is.
A. I believe that method allows you to differentiate amphiboles from chrysotile.
Q. And out of the 38,940 fibers, they found 16, 0.04 percent of them were amphiboles. And 14 of the 16 they could positively identity as tremolite, actinolite and not amosite, correct?
A. That's what they said. My previous comment still stands. There's no characterization in this paper that this result is representative in any way of the areas where we know amphiboles were being used, and the looms that we believe were weaving amphiboles.
Q. Your assumption that amphiboles were being used is not supported by the documents that say, that all of the insatape products and the insubestos were manufactured in Bloomington, correct?
If that's true, then your assumption that there were amphiboles that were made at Marshville is incorrect?
A. Sir, to the extent I'm aware of it, Mr. Aldridge testified to the manufacture of an amosite containing product

in Bloomington. Okay.

In addition, if you go back to the product catalog, it is clear that UNARCO was advertising woven products or ropes could be made with acid resistance. And acid resistance is, as far as I understand, is a particular characteristic of crocidolite asbestos. That's why it was chosen, it's an expensive product. This is clearly advertising that they could weave and make products for acid resistent applications, and that their textile plant was Marshville, North Carolina.

Q. But they don't say anywhere in that catalog that the products that we're making for acid resistance come out of Marshville. They don't say that. They just say, we can do it. And we know from their interrogatory responses, that any products that contained amphibole, were manufactured in Bloomington, correct?

A. I don't know that. What I know is that their textiles came out of Marshville. That's what their catalog says. And that some of their textiles were made with acid resistent asbestos.

Q. What you didn't do, and what your counsel didn't do is, you know there's UNARCO trust, correct? They would have all the documents from UNR. Neither one of you went to the trust to say, hey, what documents do you have from Marshville? We want to see if they have amphiboles there. You didn't do that, correct?

A. I do not have access to the UNR trust, as far as I'm aware.
Q. And your counsel didn't present you with any documents that came out of the UNR trust that were UNARCO documents from the time period before 1963 when UNARCO owned that plant, correct?
A. I have not seen documents from the UNR trust.
MR. GEORGE: I have nothing further, Your Honor. Thank you.
MR. GUY: Your Honor, I hate to do it, but I have very short --

CROSS EXAMINATION

BY MR. GUY:
Q. Mr. Garabrant, my name is Jonathan Guy. I represent the FCR in this case, Joseph Grier, III.
A. Good morning -- good afternoon.
Q. Good afternoon. Anyway, sorry. I'll be very brief.
Your testimony today on direct related largely to your 2004 article on meta-analysis, correct?
A. No. My testimony today relies on the meta-analysis I conducted as part of my work on this case. It relied on similar methods to the 2004 publication, but it included a substantial body of additional scientific literature.
Q. Was that article published so it was available to the public to review?

A. The Goodman article; yes.
Q. Would it have been available to asbestos defendants such as Garlock, correct?
A. I'm not sure I understand. The Goodman article is in Annals of Occupational Hygiene. Anyone who can get to a library, a medical library, can get a copy of it, or anyone can, I think, purchase it from the journal.
Q. Anyone including an asbestos defendant like Garlock, correct?
A. As far as I'm aware, anyone can purchase it, including Garlock.
Q. And in your report, sir, you relied upon earlier articles, correct, going back to McDonald in 1980?
A. In my report I replied -- I relied on every article I could find, up through the date I wrote the report. And as we have seen today, I have now added the Roelofs article which is a few weeks old.
Q. I just put that on the bottom.
Were those all published in such a way that they were accessible by the public, each of those articles?
A. I believe they are.
Q. And they would have been available to asbestos defendants, correct?
A. As far as I'm aware, yes.
Q. Asbestos defendants such as Garlock, correct?

A. As far as I'm aware, they're all publicly available to anyone who inquires and pays whatever the fee is to get a copy.

Q. And you testified at trial for various asbestos defendants, correct?

A. I have testified at trial, principally in the area of friction product defendants.

MR. GUY: No further questions, Your Honor.

THE COURT: Anything else, Mr. Schachter?

MR. SCHACHTER: Thank you, Your Honor. I just want to clear up a couple of points.

THE COURT: All right.

REDIRECT EXAMINATION

BY MR. SCHACHTER:

Q. Sir, you were shown some dust samples, or some discussion of dust samples. If indeed as Dr. Dement explained, those dust samples were taken in the 1960s when another company, a brake manufacturer owned the plant, Raybestos, would those dust samples be relevant at all to what was occurring when UNARCO owned the plant?

A. It would be difficult to say whether they had any relationship at all.

Q. And secondly, the documents you've reviewed, are the same documents that we presented to the expert witness hired by Mr. Smith George's firm. And I want to show what he talked

about, what he said about those and see if your opinions differ. Just one moment.

MR. GEORGE: I object to using deposition testimony that he hadn't seen, the witness isn't here to cross examine.

MR. SCHACHTER: We just spent 45 minutes of precious time debating something that even their guy --

THE COURT: Go ahead. Put it up and we'll go through it.

MR. SCHACHTER: Apologize, Your Honor.

Q. Sir, we took Dr. Brodkin's testimony from Mr. Smith George firm, and we asked him if he had reviewed the Marshville documents. And he said, yes, I read them. I asked, what were your conclusions. He said, well, I think there's evidence as we talked about in South Carolina cohorts, that at times at various plants, there were materials other than chrysotile, namely in the Marshville plant, amosite was used for material, I believe insafelt (phonetic). So there was some mixed fiber use at the Marshville plant which would have been plant four.

Then I asked him about this article. Had you been a peer reviewer, would you have permitted a study to be published had you known about these documents saying that only chrysotile was used at the Marshville plant. He said, well, I would have been aware of that -- I would have asked them to add that information.

So I asked him, so the Marshville -- anything about the Marshville plant in your opinion cannot be taken as indicating that that was a plant where only chrysotile was used, given what we now know? And he agreed that he can't state that it's only a chrysotile plant. He would have to say like the other plant three, it's a chrysotile dominant plant, but that at times amosite was used.

Are your conclusions any different than the expert that they hired on this issue?

A. Well --

Q. On whether amosite was used in Marshville?

A. Yeah. Mr. Schachter, my conclusion is that amosite was used at Marshville. That's quite clear. We know they were shipping amosite products, they were making amosite products, they have looms weaving amosite products. Amosite was used in that plant.

MR. SCHACHTER: Thank you. I'll pass the witness, Your Honor.

THE COURT: Thank you. You can step down. Thank you, Dr. Garabrant.

Let's take a break and come back at 2:15.

(Lunch recess at 1:08 p.m.)

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UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NORTH CAROLINA
CERTIFICATE OF REPORTER

I, Laura Andersen, Official Court Reporter, certify that the foregoing transcript is a true and correct transcript of the proceedings taken and transcribed by me.

Dated this the 23rd day of July, 2013.

s/Laura Andersen
Laura Andersen, RMR
Official Court Reporter